OFFICIAL PUBLICATIONS
OF CORNELL UNIVERSITY

VOLUME V NUMBER 12

NEW YORK STATE COLLEGE OF AGRICULTURE ANNOUNCEMENT 1914-15

JUNE 1, 1914
PUBLISHED BY CORNELL UNIVERSITY
ITHACA, NEW YORK

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CALENDAR

First Term, 1914–15

Sept.	11,	Friday,	University entrance examinations begin.
Sept.	21,	Monday,	Academic year begins. Registration of new students. All special students in the College of Agriculture must first present themselves at the office of the Secretary, Roberts Hall 122, unless permission to register has previously been sent to them by the Registrar.
Sept.	22,	Tuesday,	Registration of new students.
Sept.	23,	Wednesday,	Registration of old students.
Sept.	24,	Thursday,	Instruction begins. President's annual address to the students.
Sept.	26,	Saturday,	Registration, graduate students.
Oct.	13,	Tuesday,	Last day for payment of tuition.
Nov.	10,	Tuesday,	Registration of winter-course students.
Nov.		Thursday–Friday	Thanksgiving recess.
Dec.	19,	Friday,	Instruction ends in winter courses.
Dec.	22,	Tuesday,	Instruction ends in regular courses. Christmas recess.
Dec.	29,	Tuesday,	Instruction resumed in winter courses.
Jan.	5,	Tuesday,	Instruction resumed in regular and special courses.
Jan.	11,	Monday,	Founder's Day.
Jan.	25,	Monday,	Term examinations begin.

Second Term, 1914–15

Feb.	6,	Saturday,	Registration, undergraduates.
Feb.	8,	Monday,	Instruction begins.
Feb.	12,	(week of)	Farmers' Week.
Feb.	12,	Friday,	Instruction ends in winter courses.
Feb.	26,	Friday,	Last day for payment of tuition.
March	31,	Wednesday,	Instruction ends } Spring recess.
April	8,	Thursday,	Instruction resumed }
May	22,	Saturday,	Navy Day.
June	2,	Wednesday,	Term examinations begin.
June	16,	Wednesday,	Forty-sixth Annual Commencement.

Third Term, 1914–15

June	7,	Monday,	Registration.
June	8,	Tuesday,	Instruction begins.
Sept.	22,	Wednesday,	Term ends.

Summer School in Agriculture, 1915

July	5,	Monday,	Summer School begins.
Aug.	13,	Friday,	Summer School ends.

First Term, 1915–16

Sept.	17,	Friday,	Entrance examinations begin.
Sept.	27–28,	Monday–Tuesday,	Registration of new students.
Sept.	29,	Wednesday,	Registration of old students.
Sept.	30,	Thursday,	Instruction begins.

NEW YORK STATE COLLEGE OF AGRICULTURE

FACULTY

Jacob Gould Schurman, A.M., D.Sc., LL.D., President of the University.
Beverly Thomas Galloway, B.Agr. Sc., LL.D., Director of the College of Agriculture and Dean of the Faculty.
Isaac Phillips Roberts, M.Agr., Professor of Agriculture, Emeritus.
John Henry Comstock, B.S., Professor of Entomology and General Invertebrate Zoology, Emeritus.
Henry Hiram Wing, M.S. in Agr., Professor of Animal Husbandry.
Thomas Lyttleton Lyon, Ph.D., Professor of Soil Technology.
John Lemuel Stone, B.Agr., Professor of Farm Practice.
James Edward Rice, B.S.A., Professor of Poultry Husbandry.
George Walter Cavanaugh, B.S., Professor of Chemistry in its Relations to Agriculture.
George Nieman Lauman, B.S.A., Professor of Rural Economy.
Herbert Hice Whetzel, M.A., Professor of Plant Pathology.
Elmer O. Fippin, B.S.A., Extension Professor of Soil Technology.
George Frederick Warren, Ph.D., Professor of Farm Management.
William Alonzo Stocking, jr., M.S.A., Professor of Dairy Industry.
Charles Scoon Wilson, A.B., M.S.A., Professor of Pomology.
Charles Henry Tuck, A.B., Professor of Extension Teaching.
Albert Russell Mann, B.S.A., Secretary to the College of Agriculture, Registrar, and Professor of Agricultural Editing.
Wilford Murray Wilson, M.D., Professor of Meteorology.
Ralph Sheldon Hosmer, B.A.S., M.F., Professor of Forestry.
James George Needham, Ph.D., Professor of Entomology and Limnology.
Bryant Fleming, B.S.A., Professor of Landscape Art.
Rollins Adams Emerson, B.Sc., Ph.D., Professor of Plant Breeding.
Harry Houser Love, Ph.D., Professor of Plant Breeding Investigations.
Arthur Witter Gilbert, Ph.D., Professor of Plant Breeding.
Donald Reddick, Ph.D., Professor of Plant Pathology.
Edward Gerrard Montgomery, M.A., Professor of Farm Crops.
George Alan Works, B.Ph., M.S. in Agr., Professor of Rural Education.
Flora Rose, B.S., M.A., Professor of Home Economics.
Martha Van Rensselaer, A.B., Professor of Home Economics.
William Albert Riley, Ph.D., Professor of Insect Morphology and Parasitology.
James Adrian Bizzell, Ph.D., Professor of Soil Technology.
Glenn Washington Herrick, B.S.A., Professor of Economic Entomology and Entomologist of the Experiment Station.
Howard Wait Riley, M.E., Professor of Rural Engineering.
Harold Ellis Ross, M.S.A., Professor of Dairy Industry.
Hugh Charles Troy, B.S.A., Professor of Dairy Industry.
Samuel Newton Spring, B.A., M.F., Professor of Forestry.
Karl McKay Wiegand, Ph.D., Professor of Botany.
William Henry Chandler, M.S. in Agr., Professor of Research in Pomology.
Arthur Bernhard Recknagel, B.A., M.F., Professor of Forestry.
Merritt Wesley Harper, M.S., Professor of Animal Husbandry.
Cyrus Richard Crosby, A.B., Extension Professor of Entomology.

Elmer Seth Savage, M.S.A., Ph.D., Professor of Animal Husbandry.
Kenneth Carter Livermore, B.S. in Agr., Ph.D., Professor of Farm Management.
Edward Albert White, B.S., Professor of Floriculture.
Alvin Casey Beal, Ph.D., Professor of Floriculture.
Herbert Andrew Hopper, B.S.A., Extension Professor of Animal Husbandry.
Edward Sewall Guthrie, M.S. in Agr., Ph.D., Professor of Dairy Industry.
Maurice Chase Burritt, B.S. in Agr., Extension Professor and State Director of Farm Bureaus.
Frank Benjamin Moody, A.B., M.S.F., Extension Professor of Forestry.
William Charles Baker, B.S.A., Professor of Drawing.
Mortier Franklin Barrus, A.B., Ph.D., Extension Professor of Plant Pathology.
Lewis Josephus Cross, B.A., Ph.D., Professor of Chemistry in its Relations to Agriculture.
Oskar Augustus Johannsen, A.M., Ph.D., Professor of General Biology.
Clyde Hadley Myers, M.S., Ph.D., Professor of Plant Breeding.
George Abram Everett, A.B., LL.B., Assistant Professor of Extension Teaching.
Lewis Knudson, B.S.A., Ph.D., Assistant Professor of Botany.
James Chester Bradley, Ph.D., Assistant Professor of Systematic Entomology.
E. Gorton Davis, B.S., Assistant Professor of Landscape Art.
John Bentley, jr., B.S., M.F., Assistant Professor of Forestry.
George Charles Embody, Ph.D., Assistant Professor of Aquiculture.
Harry Oliver Buckman, M.S.A., Ph.D., Assistant Professor of Soil Technology.
Mrs. Helen Binkerd Young, B.Arch., Assistant Professor of Home Economics.
Alice Gertrude McCloskey, A.B., Assistant Professor of Rural Education.
Mrs. Anna Botsford Comstock, B.S., Assistant Professor of Nature Study.
Ralph Hicks Wheeler, B.S., Assistant Professor of Extension Teaching.
Harry Morton Fitzpatrick, Ph.D., Assistant Professor of Plant Pathology.
Byron Burnett Robb, B.S. in Agr., Assistant Professor of Rural Engineering.
Walter Warner Fisk, M.S. in Agr., Assistant Professor of Dairy Industry.
Halsey B. Knapp, B.S., Assistant Extension Professor of Pomology.
Ralph Wright Curtis, M.S.A., Assistant Professor of Landscape Art.
Vern Bonham Stewart, A.B., Ph.D., Assistant Professor of Plant Pathology.
Annette J. Warner, Assistant Professor of Home Economics.
Arthur Lee Thompson, M.S. in Agr., Assistant Professor of Farm Management.
Royal Gilkey, B.S.A., Assistant Professor of Extension Teaching, and Supervisor of Mailing Division and Reading Courses.
Charles Truman Gregory, B.S., in Agr., Assistant Professor of Plant Pathology.
Lex Ray Hesler, A.B., Ph.D., Assistant Professor of Plant Pathology.
Ivan Claude Jagger, B.S. in Agr., Assistant Professor of Plant Pathology.
William Howard Rankin, A.B., Assistant Professor of Plant Pathology.
Earl Whitney Benjamin, B.S. in Agr., Ph.D., Assistant Professor of Poultry Husbandry.
Arthur Johnson Eames, Ph.D., Assistant Professor of Botany.
James Kenneth Wilson, B.S., Ph.D., Assistant Professor of Soil Technology.
Elmer Eugene Barker, A.B., Assistant Professor of Plant Breeding.
Edward Mowbray Tuttle, B.S. in Agr., A.B., Assistant Professor of Rural Education.
Robert Matheson, M.S. in Agr., Ph.D., Assistant Professor of Economic Entomology.
Blanche Evans Hazard, A.B., Assistant Professor of Home Economics.

David Lumsden, Assistant Professor of Floriculture.
Paul Work, A.B., M.S. in Agr., Superintendent of the Department and Instructor in Vegetable Gardening.
George Walter Tailby, jr., Instructor, and Superintendent of Live Stock.
Howard Edward Babcock, Ph.B., Assistant State Director of Farm Bureaus.
Anna Clegg Stryke, A.B., Instructor in Entomology.
Lester Whyland Sharp, B.S., Ph.D., Instructor in Botany.
John Thomas Lloyd, A.B., Instructor in Limnology.
Bertha E. Titsworth, Instructor in Home Economics.
Clara Wittmer Browning, B.S., Instructor in Home Economics.
Helen Knowlton, A.B., Instructor in Home Economics.
Cecil Calvert Thomas, A.B., M.A., Instructor in Botany.
Mrs. Maude Cipperly Wiegand, A.B., Instructor in Botany.
William Jacob Robbins, A.B., Instructor in Botany.
Harold Allen Severy, A.B., A.M., Instructor in Botany.
Earle Volcart Hardenburg, B.S., Instructor in Farm Crops.
Richard Alan Mordoff, B.S. in Agr., Assistant Registrar.
Otis Freeman Curtis, M.S., Instructor in Botany.
Oliver Wesley Dynes, M.S. in Agr., Instructor in Farm Crops.
Carl Edwin Ladd, B.S. in Agr., Instructor and Investigator in Farm Management.
Daniel Scott Fox, B.S., Instructor in Farm Management.
Roland Harrison Patch, B.S., Instructor in Floriculture.
Albert Edmund Wilkinson, B.S., Extension Instructor in Vegetable Gardening.
Thomas Joseph McInerney, M.S. in Agr., Instructor and Investigator in Dairy Industry.
Horace Mann Pickerill, B.S. in Agr., Instructor and Investigator in Dairy Industry.
Harvey Lyon Ayres, Extension Instructor in Dairy Industry.
Eugene Davis Montillon, B.Arch., Instructor in Landscape Art.
Juan Estevan Reyna, E.E., Instructor in Drawing.
Norman Damon Steve, B.S., Instructor in Farm Engineering.
Leslie Eugene Hazen, B.S. in Agr., Instructor in Farm Structures.
James Lewis Strahan, B.S. in Agr., M.S. in Agr., Instructor in Farm Structures.
Earl Long Overholser, M.S.A., Instructor in Pomology.
Cass Ward Whitney, B.S., Instructor in Extension Teaching.
Royal Josylin Haskell, B.S., Instructor in Plant Pathology.
Frank Elmore Rice, A.B., Instructor in Agricultural Chemistry.
Jesse Burdette Bain, A.B., Instructor in Animal Husbandry.
Elmer Rosel Zimmer, Instructor in Animal Husbandry.
Charles Paul Alexander, B.S., Instructor in The Farm Course.
Charles Chupp, A.B., Instructor in Plant Pathology.
Laurence Howland McDaniels, A.B., Instructor in Botany.
Allan Cameron Fraser, B.S., Instructor in Plant Breeding.
Lua Alice Minns, B.S., Instructor in Floriculture.
Alfred Carl Hottes, B.S., M.S. in Agr., Instructor in Floriculture.
George Cornell Supplee, B.S., M.S.A., Instructor in Dairy Industry.
Anna Elizabeth Hunn, B.S., Instructor in Home Economics, and Manager of Cafeteria.
William Thomas Craig, Instructor in Plant Breeding.
Montgomery Robinson, Litt. B., B.S., Instructor in Extension Teaching.

Josiah Randall Livermore, B.S., Instructor in Plant Breeding.
Joseph Rosenbaum, B.S. in Agr., Extension Instructor in Plant Pathology.
Arthur John Heinicke, B.S.A., M.A., Instructor in Pomology.
Francis Elton Rogers, B.S., Extension Instructor in Pomology.
Olney Brown Kent, B.S., Instructor in Poultry Husbandry.
Harold Deane Phillips, B.S. in Agr., Instructor in Rural Economy.
Henry William Schneck, B.S., Instructor in Vegetable Gardening.
Wesley Worth Warsaw, B.S. in A.E., Extension Instructor in Soil Technology.
William Warren Knudson, B.S., Instructor in Vegetable Gardening.

Other Officers of Instruction and Administration

Louis Hamilton Moulton, Farm Superintendent.
Carl Ilg, Assistant Curator in Entomology.
Ada Eljiva Georgia, Assistant in The Farm course.
William Carlyle Etheridge, B.S., M.S. in Agr., Assistant in Farm Crops.
Ira Myron Hawley, A.B., Assistant in Economic Entomology.
Walter Miller Peacock, B.S., Assistant in Farm Crops.
Rowland Willis Leiby, B.S., Assistant in Insect Morphology.
William Frederick Friedman, B.S., Assistant in Plant Breeding.
Julia Zita Kelly, Secretary and Curator in Floriculture.
Charles Herbert Van Auken, Clerk and Accountant in Animal Husbandry.
Walter Gernet Krum, Assistant and Superintendent in Poultry Husbandry.
Elizabeth Faith Genung, B.S. in Agr., Assistant in Dairy Industry.
Henry Joseph Conlin, A.B., Assistant in Agricultural Chemistry.
William Francis Flynn, B.Chem., Assistant in Agricultural Chemistry.
Vern Reuben Jones, B.S., Assistant in Dairy Industry.
Howard Bowman Ellenberger, B.S.A., Assistant in Dairy Industry.
Ralph Irving Scoville, B.S., Assistant in Dairy Industry.
Claribel Nye, B.S., Assistant in Home Economics.
Bernard William Shaper, B.S., Assistant in Extension Teaching.
Clark Leonard Thayer, B.Sc., Assistant in Floriculture.
Gail J. Fink, A.B., Ph.D., Assistant in Soil Technology.
David Stout Jennings, B.S., Assistant in Soil Technology.
Mortimer Demarest Leonard, B.S., Extension Assistant in Entomology.
Millard Alschuler Klein, B.Sc., Assistant in Soil Technology.
James LeRoy Weimer, A.B., Assistant in Plant Pathology.
John Douglas Tothill, B.S.A., Assistant in Parasitology.
Arthur Bishop Beaumont, B.S., Assistant in Soil Technology.
Cornelia Ferris Kephart, B.S. in Agr., Library Assistant in Department of Entomology.
Charles Edward Hunn, Foreman of Grounds.
Andrew Jackson Lamoureux, Assistant in Library.
George Wilson Parker, Clerk and Accountant.
Lucy Harriet Ashton, Assistant to the Registrar.
Emmons William Leland, B.S.A., Superintendent of Field Experiments in Soil Technology.
Anna Mary Atwater, Laboratory Assistant in Plant Breeding.
Laura McLallen Van Auken, Clerk in Department of Dairy Industry.

THE NEW YORK STATE COLLEGE OF AGRICULTURE

Cornell University is composed of eight colleges and the Graduate School. One of these colleges is the College of Agriculture.

Cornell University was chartered by the Legislature in 1865, being founded on the Land-Grant Act of 1862. By the terms of the Land-Grant Act, teaching in agriculture has been from the first a regular part of the university enterprise. In other states, the state government has made appropriations to supplement the work in agriculture. In 1904 the Legislature of the State of New York made an appropriation of $250,000 for the erection of buildings for the College of Agriculture in Cornell University and established the College as a state institution under the title "The New York State College of Agriculture at Cornell University." Before this time the State had established at Cornell University "The New York State Veterinary College." In 1906 the Legislature passed an Administration Act defining the purpose and activities of the College of Agriculture thus: "The object of the said college of agriculture shall be to improve the agricultural methods of the state; to develop the agricultural resources of the state in the production of crops of all kinds, in the rearing and breeding of livestock, in the manufacture of dairy and other products, in determining better methods of handling and marketing such products, and in other ways; and to increase intelligence and elevate the standards of living in the rural districts. For the attainment of these objects the college is authorized to give instruction in the sciences, arts, and practices relating thereto, in such courses and in such manner as shall best serve the interests of the state; to conduct extension work in disseminating agricultural knowledge throughout the state by means of experiments and demonstrations on farms and gardens, investigations of the economic and social status of agriculture, lectures, publications of bulletins and reports, and in such other ways as may be deemed advisable in the furtherance of the aforesaid objects; to make researches in the physical, chemical, biological, and other problems of agriculture, the application of such investigations to the agriculture of New York, and the publication of the results thereof."

THE BUILDINGS AND FARMS

The buildings erected under the enactment of 1904 were first occupied in June, 1907. Subsequently the Legislature provided for the erection of two large barns, greenhouses, a home economics building, a poultry husbandry building, and an auditorium. Appropriations have also been made for the extension of the greenhouse range and the construction of two animal husbandry buildings, a forestry building, an agronomy building, additional barns, a rural schoolhouse, buildings for fowls in the Department of Poultry Husbandry, and a general heating-plant for the College of Agriculture, these buildings now being under construction or under plan. The Forestry Building and the Animal Husbandry Building will be fully in use before the opening of the college year 1914–15.

The central, or original, buildings consist of a group of three—Roberts Hall, Dairy Building, Agronomy Building—and a detached building occupied by the Department of Animal Husbandry. The three buildings in the main group are

connected by loggias and have a total frontage of four hundred and eighty-four feet. They occupy a site to the east of the original university campus. All the buildings are of brick.

The Main, or Administration, Building, known as Roberts Hall, central in the group of three, has in the basement mailing and storage rooms for the publications of the College, the office of *The Cornell Countryman*, an extension office, a large lavatory with baths and lockers, and a students' room. A completely inclosed passageway leads to the basement of the Dairy Building on the east and to the Agronomy Building on the west. The first floor, to the west of the main entrance, contains the offices of administration, including the offices of the Director and of the Secretary, and the business office. To the east are offices for extension teaching, the library, and the editorial office. Between these two groups of rooms is the assembly hall, seating about six hundred persons. The second floor is occupied by the Departments of Pomology and Floriculture, with lecture rooms, laboratory, and offices for the staff. Here is provided also a women's rest room and lavatory. The Department of Entomology, Biology, and Nature Study occupies the third and fourth floors, which include the museum and the offices of the staff. Quarters are provided for the work in limnology. In the center of the fourth floor is a suite of rooms occupied by the Central Station, New York Section, of the Weather Bureau of the United States Department of Agriculture.

The Dairy Building, the Agronomy Building, and the Animal Husbandry Building are described in detail on the following pages, under the departments occupying them.

The later buildings. The college compound is being rapidly enlarged by the addition of special buildings for the separate departments. The Home Economics Building, the Forestry Building, and the Poultry Building are now completed and occupied. The two buildings for animal husbandry are practically finished. Bailey Hall, an auditorium having a seating capacity of nearly twenty-two hundred persons, is in use. Work on the new Agronomy Building is well under way. The new horse and stock barns are in use, and funds are available for the erection of hog and sheep barns and a tool barn.

Other smaller buildings included in the present equipment are a frame building that temporarily houses the Department of Rural Engineering, a rural schoolhouse that serves as the headquarters for the Department of Rural Education, an insectary, a biological station in the marsh at the south end of Cayuga Lake, a fish-breeding house in Cascadilla Creek, a seed storage house, and other small buildings on the farms.

These several buildings are described in detail on the following pages under their respective departments.

The farms. The College of Agriculture has 909 acres of land and it rents 195 acres additional, making a total of 1104 acres under college management. These farms are run not for commercial but for educational purposes, and the practices are therefore modified to meet the varied demands of the institution.

Land in the vicinity of the College is very broken, abounding in hills and dales, brooks and gorges. In consequence, less than one-half of the total area is now available for tillage. Of the 1104 acres, 567 are classified as arable, 304 as pasture, and 143 as wood and waste, 51 are devoted to the agricultural college campus and buildings, and 39 are retained for other uses.

Of the tillable area, 45 acres have been laid out in permanent experiment plots for the use of the Departments of Soil Technology and Plant Breeding; 50 acres have been assigned to the Department of Pomology and are largely planted to young trees; 45 acres have been assigned to the Departments of Floriculture and Vegetable Gardening, 73 acres to the Department of Poultry Husbandry, and 15 acres to farm-crops gardens and experiments; and there are left to the Department of Farm Practice 339 acres on which to conduct the regular farm operations.

The soil of the college farms is heavy, nearly all of it being Dunkirk clay loam. A few fields at the extreme southeastern corner are Volusia stony loam. The Dunkirk clay loam is entirely unsuited to potatoes and is not well adapted to corn, but will grow fair crops of corn if heavily manured. It is well adapted to wheat, oats, timothy, and clover. The Volusia stony loam is well adapted to corn and potatoes when well drained and freed from stones. The recently acquired areas lack both these improvements.

In order that they may be readily accessible from the college buildings, the principal barns have been located at the extreme western end of the large farm domain. This necessitates a long haul for a large part of the farm crops and the manure, entailing a heavy labor cost.

In planning the cropping scheme, or rotations, for the farms, three considerations have been kept in view: the soil adaptation, the long haul, and the forage requirements of the live-stock. Fortunately, these considerations harmonize in the main. The heavy soil and the long haul make the growing of the desired amount of corn for silage a difficult task. It is on this point that the rotations hinge. The needed silage cannot be purchased elsewhere. A surplus of silage or corn fodder could not be disposed of. Sufficient silage corn is grown, so far as possible within easy hauling distance of the barns. Besides corn, the farms raise oats, wheat, clover, timothy, and potatoes, because these crops are adapted to the soil and are needed at the barns or are for ready sale.

THE COLLEGE LIBRARIES

The library facilities of the College of Agriculture include: a large collection of books and periodicals on agriculture, horticulture, forestry, entomology, and other kindred subjects, contained in the University Library and numbering about 15,000 volumes; the Agricultural College Library in Roberts Hall, with a working and a reference collection of approximately 5000 bound volumes and a large number of bulletins, reports, and other pamphlets in unbound form; the Entomological Library (Roberts Hall, Room 403, fourth floor), one of the largest and best working libraries in general entomology in the United States; and various small departmental collections for laboratory and office use. In addition to these, the Agricultural College Library possesses the Craig horticultural library, gift of the widow of the late Professor John Craig, consisting of about 3000 volumes and considered to be one of the best private collections in the United States; this collection will be made available during the coming year. The Department of Animal Husbandry has a large and rapidly increasing collection of herdbooks, registers, and the like, for the use of its instructing staff and its students. Altogether, about 30,000 volumes are available for the instructing staff and the students of the College of Agriculture—including the Craig library and the duplicates carried by the various laboratories—all of which, except the Craig and laboratory collections, are

regularly catalogued at the University Library and are under its general rules and supervision. The Agricultural College Library and the Entomological Library are practically branches of the University Library and enjoy the services of its purchasing and cataloguing departments.

All these libraries are likewise provided with the principal periodicals relating to agriculture and kindred subjects. In the University Library are to be found the files and current numbers of the leading foreign periodicals, especially those of a purely scientific character and those used chiefly for research. The Agricultural Library carries on its shelves nearly three hundred periodicals of various kinds for the use of students; these include the principal agricultural, horticultural, and stock-raising journals of the United States and Canada, together with many from foreign countries. The Entomological Library is supplied with the leading periodicals relating to general and economic entomology. In addition to these, many of the departments receive periodicals for the use of instructors and students, and the Departments of Dairy Industry, Home Economics, and Poultry Husbandry maintain small reading-rooms of their own.

All the books of the Agricultural College Library are in reserve for reference purposes only; students are allowed to draw them for home use only when the library is closed over night and over Sunday. In order to afford the greatest possible opportunity for using the books, the Agricultural College Library is open from a quarter of nine in the morning until ten o'clock at night every day of the week during the college year except Saturdays, when it is closed at one o'clock in the afternoon.

EQUIPMENT OF THE DEPARTMENTS

Agricultural Chemistry

The instruction in agricultural chemistry is given in Morse Hall. Here ample facilities are provided for laboratory work, which is made an important part of the instruction. The laboratories are well lighted and are provided with gas, electric light, distilled water, and compressed air. Each student is supplied with complete apparatus for quantitative analysis. The work is arranged to familiarize the student with the composition and properties of the more important agricultural chemicals.

For the advanced courses there is a special laboratory accommodating twenty-four students.

The lecture rooms are provided with electric projection lanterns for illustrating the lectures, and have large, well-equipped lecture tables. There are also a chemical museum, a library, and a reading-room.

Animal Husbandry

The equipment in animal husbandry available for purposes of instruction is as follows:

1. **The college herds and flocks.** A herd of about one hundred and twenty-five head of cattle is maintained. Aside from a carload of steers fed for market each year, it is essentially a dairy herd, to a large extent bred and developed by the College itself. At present it contains representative specimens of Holsteins, Jerseys, Guernseys, Ayrshires, and Shorthorns.

The College maintains an imported Percheron stallion and a pure-bred Hackney stallion. Eight pure-bred Percheron mares are used primarily for breeding purposes. The farm teams illustrate grade draft horses of several types.

A flock of about one hundred and twenty-five sheep includes representative specimens of Dorsets, Shropshires, and Rambouillets. A mixed flock is also maintained for the production of winter, or hothouse, lambs.

About ten brood sows of the Cheshire breed, "the New York Farmer's Hog," are kept to utilize waste dairy products and to illustrate a profitable early-maturing butcher's hog of a semi-bacon type.

2. **Herd books and flock books.** The library of herd books and flock books is large, comprising more than one thousand volumes and including complete sets dealing with all the more important breeds and with many of the lesser ones.

A fairly complete collection of lantern slides illustrating breed types, and skeletons of the horse and the ox, add to the material available for classroom purposes.

The new headquarters building for the Department of Animal Husbandry is at the eastern end of the campus. It is approximately fifty by ninety feet in area, with an extension about fifty by fifty feet, is three stories high, with a high basement, and contains offices, laboratories, lecture rooms, and classrooms for the Department.

The large stock-judging pavilion adjacent is eighty by one hundred and eighty feet in size, with a clear span. It will give abundant opportunity, not only for stock-judging purposes, but also for the exhibition of horses and horsemanship.

Botany

The Department of Botany is well supplied with microscopes and other necessary laboratory equipment, while the college farm and the ravines, marshes, and forests about Ithaca are unusually rich in botanical material.

The Laboratory of Plant Physiology is well equipped for instruction and research. The laboratory facilities include microscopes, microtomes, incubators, ovens, sterilizers, and other special physiological and bacteriological apparatus; precision instruments for the measurement of environmental conditions; chemical tables, titration stands, a nitrogen still, balances, glassware, and other materials required in that part of the work dealing with biochemistry and fermentation.

The instruction is arranged with reference, not merely to persons who are interested in various phases of plant industry, but also to those who may be preparing themselves as teachers or as investigators in related lines. Special opportunities are offered to those properly trained in physiology, horticulture, and agronomy, to undertake fundamental investigations in the general field of plant response and behavior.

The new greenhouses offer opportunities for class work and for individual investigation. Moreover, the university farms and grounds will supply, for those who may devote the growing season to their investigations, a variety of crops and ornamental plants needed for particular observation and experiment.

Dairy Industry

The Department of Dairy Industry occupies the building east of the main agricultural building and connected with it by a loggia. The classrooms,

bacteriological and testing laboratories, locker rooms, reading-room, offices, and dairy-mechanics rooms occupy a part of the building, fifty by one hundred feet in size and three stories high. All manufacturing work is conducted in the remaining part of the building, sixty by one hundred and sixty feet in area and one story high. The manufacturing rooms are thoroughly sanitary, fully equipped, and well adapted for instruction and for commercial work. In the winter about fifteen thousand pounds of milk are handled daily, and in the summer the milk received at the Dairy Building and the cream received from six skimming stations represent about thirty thousand pounds of milk daily. The skimming stations are located at short distances north of Ithaca and are equipped and conducted as are stations operated exclusively for commercial purposes.

Instruction is given by lectures and recitations, supplemented by practice in laboratories and manufacturing rooms. The practice is of seven kinds:

1. **Testing milk and milk products for their quality.** The testing laboratory is equipped with lockers for students, the leading styles of turbine and hand centrifugal Babcock testers, one Russian Babcock tester, one Gerber tester, casein testers, moisture and acid testing apparatus, lactometers, and all necessary glassware.

2. **Dairy bacteriology.** This division is provided with two large and well-lighted laboratories, one wash and hot-air sterilizing room, individual desks and lockers for students, full equipment for making media, hot air and steam sterilizers, incubators for maintaining constant temperatures, high-speed centrifuges for determining dirt and bacteria content of milk, high-power microscopes, and all glassware necessary for bacteriological work.

3. **Butter making.** This work is conducted in several separate rooms. The farm-dairy rooms contain leading kinds of hand-power separators and churns, and various apparatus used in a dairy where butter is made in small quantities. Creamery methods are taught chiefly in a large creamery room, which is provided with several types of power separators, milk heaters, and pasteurizers, and with different kinds of power churns and workers. There are special rooms for ripening cream and for holding butter in cold storage. There is also a boiler room, with a thirty-horsepower boiler, an engine, and necessary pumps.

4. **Cheddar-cheese making.** The room for this work is equipped with vats for making cheese in small or large quantities, one horizontal continuous pressure press, one upright press, hoops for making cheese in four sizes, rennet tests, acid tests, curd mills, and other small apparatus. Four insulated curing-rooms adjoin the manufacturing room.

The milk-receiving room and the can-washing room are convenient to the creamery and cheese rooms. These are provided with scales, a composite sample outfit, and a power can washer and rinser.

5. **Fancy-cheese and ice-cream making.** Making-rooms and curing-rooms with necessary equipment, including an ice machine, are provided for the manufacture of a few varieties of fancy cheese. Both hand and power equipment is used for ice-cream work.

6. **Market-milk handling.** For this course there are five rooms. Four of these are connected, and are equipped with sterilizer, rotary bottle washer, bottle

filler, and all the apparatus necessary for conducting a commercial market-milk business. In the arrangement of these rooms the principles governing the proper management of any commercial sanitary milk plant have been considered. The College operates a milk route for the disposal of the milk produced by the college herd, and all records are kept in the same manner as in any commercial market-milk plant. The fifth room is intended exclusively for teaching, and is equipped with fillers, sterilizers, coolers, pasteurizers, clarifiers, and all necessary apparatus for teaching commercial market-milk handling.

7. **Dairy mechanics.** This instruction is given in the Department of Rural Engineering. The equipment includes steam engines, gasoline engines, shafting, various sizes of pulleys, belts, different types of separators, and tools for pipe fitting, soldering, and plain carpenter work—a number of tools somewhat larger than would be found in many well-conducted dairy manufacturing plants.

A deposit is required to cover the value of apparatus loaned to students. When the apparatus is returned in good order the deposit is returned, less a charge of twenty-five cents to apply on losses of general equipment. Clean white suits are required for all practice work in the Department. These suits may be bought by the student or they may be rented from the Department at fifty cents a term. Lockers for these suits, as well as for equipment used by individual students in the laboratories, are provided without charge.

Drawing

The drafting-rooms and office of the Department of Drawing occupy the third floor of the Dairy Building. Skylights in the roof furnish abundant light, and the quarters are very satisfactory for the study of drawing.

There are two drafting-rooms. The one for mechanical drawing is equipped with thirty specially designed desks, each holding the materials of two students, thus providing accommodations for a total of sixty students. For instruction in this subject there is a small collection of simple machine parts, wooden models, and demonstration apparatus. The free-hand drawing room is equipped with thirty-five Cleaves drawing desks. For study there are provided a number of casts, copies of classic sculpture, artificial plant forms, and a collection of insects, shells, skulls, and stuffed birds and animals, together with a series of reproductions, in color and in black and white, of good examples of graphic art; the aim being to develop the student's appreciation of good art as well as to teach him how to draw.

Entomology

The Department of Entomology, Limnology, and Nature Study occupies the third and fourth floors of Roberts Hall. The laboratories are well equipped for all phases of entomological study. There is a good supply of microscopes and accessories, including equipment for photomicrographic work. In addition there is a very full outfit for insect photography. Ample facilities, such as microtomes, paraffin ovens, and reagents, are provided for work in insect morphology and embryology, and an extensive collection of prepared slides is at the disposal of students.

The insect collections, developed as an adjunct to the work of instruction, are especially rich in biological and illustrative material. In addition to many exotic

species, they contain specimens of a large number of the more common species of the United States. These have been determined by specialists and are accessible for comparison.

The lecture room is provided with a synoptic collection of insects, sets of the Leuckart and the Pfurtscheller diagrams, models, projection lanterns, and complete means for the projection of microscopic objects.

Adjacent to the laboratories is an insectary, which, together with the insectary of the Agricultural Experiment Station, affords to advanced students exceptional opportunities for special investigation in life histories, and for experiments in applied entomology.

For study of the life histories, biology, and economic importance of aquatic forms, unrivalled facilities are afforded by the field laboratory, located in the midst of the Renwick marshes and fully provided with breeding cages, running water, and aquaria; and by a hatching station on the university grounds in the gorge of Cascadilla Creek.

Extension

The Department of Extension Teaching is located on the first floor of Roberts Hall. Its classes are held in a room on the first floor of this building and a room on the second floor of the Dairy Building. The mailing-room, stacks, and archives, and the offices of the Cornell Reading-Course for the Farm, are in the basement of Roberts Hall.

Farm Crops

Instruction in farm crops is given by means of lectures, recitations, and field and indoor laboratory work. The Department is provided with a lecture room and a large, well-lighted laboratory. Farm-crop materials are procured for use in indoor laboratory work. Bulletins of the various experiment stations constitute a part of the laboratory equipment. The farms and experimental plots are used for laboratory work in the field.

Farm Management

Farms adjacent to Ithaca furnish laboratory material for the study of farm management. Ithaca is specially well situated for the study of farm management, because there is a great diversity of conditions. Some of the best and some of the poorest farms of the State are within easy reach of Ithaca. Excursions are made to a few farms in other parts of the State for the study of farm management. The results of the agricultural survey are useful in this study.

Floriculture

The equipment of the Department is divided into two parts: that belonging to the classrooms and offices on the second floor of Roberts Hall; and that connected with the forcing-houses and gardens, as well as with the experimental areas in the field.

1. **Classrooms and laboratories.** Lectures are given in the headquarters of the Department on the second floor of Roberts Hall. On this floor are lecture rooms, laboratories, and offices.

The larger lecture room is provided with a stereopticon and has a seating capacity of one hundred and twenty persons. The smaller lecture room seats thirty-five persons, besides providing room for the herbarium. The offices for the instructing staff are also on this floor. Large display cases lining the corridor are filled with horticultural specimens, tools, and appliances.

In addition to the large collection of floricultural books in the main University Library, the Department is fortunate in possessing the large private library of the late Professor John Craig. This contains three thousand volumes, many of which are on floricultural subjects and are available for the use of advanced students.

2. **Forcing-houses and gardens.** The greenhouses completed in 1910, together with the contemplated additions to be erected this year, cover an area of about eight thousand square feet. This range consists of a conservatory and propagating house, and a house for the culture of roses, carnations, chrysanthemums, sweet peas, and other greenhouse plants. The equipment is used by all the classes in floriculture and affords space for advanced and graduate students investigating special problems.

The service building is a two-story structure and contains laboratories, an office, and seed-storage and tool rooms.

The Department has been assigned twenty acres of land for its large collection of peonies, irises, perennial phlox, roses, sweet peas, gladioli, and miscellaneous annual and perennial flowers. These collections afford valuable material for study and offer numerous problems for investigation.

Aside from ordinary equipment, the garden herbarium, with more than twelve thousand sheets, is an important aid in the study of plant variation. There is also a good collection of negatives showing the growth of flowers, which is being added to continually and which furnishes a bountiful source for lantern slides illustrating recent methods in the management and construction of forcing-houses and the growing of flowers in the field and under glass. The Department has a collection of one thousand lantern slides, to which additions are constantly being made.

Forestry

The Department of Forestry occupies two and one half floors in the Forestry Building, which was recently built by the State at a cost of $120,000. The building is one hundred and forty-two feet long and fifty-four feet wide, and four stories in height. One floor and one half of another floor are being occupied temporarily by the Department of Plant Breeding, but the entire building is planned for the Department of Forestry and is to be used exclusively by that Department as soon as a Plant Industry Building is provided. The building affords ample room and equipment for undergraduate instruction and for advanced study.

The Department has a tract of about one hundred and seventy-five acres of open land which is being used for forest planting; another tract of thirty-eight acres, partly open land and partly wooded; and eight woodlots, including stands of white pine, hardwoods, and hemlock. All these lands are within three miles of the university campus. The Department has planted more than seventy acres of its land with experimental and demonstrational plantations. There is also a forest nursery.

A forestry library of over fourteen hundred bound volumes, including extensive files of forestry periodicals, is included in the University Library. There is an excellent collection of forestry instruments.

Home Economics

The Department of Home Economics moved into its new and well-equipped building in February, 1913. In the basement of the building is a cafeteria, with kitchens and laundry. On the first floor are offices, classrooms, and an apartment in which students in turn have practice in family housekeeping. On the second floor is the assembly room, in which are held the large classes of the Department, public lectures, and social functions of the College and of the Department. Opposite the assembly room are a large family kitchen and a dining-room for serving. At both ends of the hall are thoroughly equipped food laboratories for teaching the principles of food preparation and nutrition. The third floor is devoted to sewing laboratories. At the east end of the hall on this floor are a chemistry laboratory, not yet equipped, and offices which have been given over to the temporary use of the Department of Vegetable Gardening. On the fourth floor are taught house planning and house furnishing, for which there is provided a large drafting-room, well lighted by means of a skylight. In front of the drafting-room is a loggia. At the west end of this floor is the household-management laboratory; at the east end, the recreation room for students.

The Home Economics Lodge, west of the Home Economics Building, is a small house which has been reconstructed and redecorated, in which students of the Department, together with an instructor, keep house. The principles of food preparation, household management, and house furnishing are taught here in a practical way.

The Department has a good equipment of reference books, lantern slides, illustrative material, and labor-saving devices.

Landscape Art

The Department of Landscape Art occupies its own building, a frame structure recently remodeled and enlarged for its use. On the first floor are the departmental offices, and a lecture room equipped with stereopticon lantern and having a seating capacity of seventy persons. The second floor is devoted to a single large drafting-room, approximately twenty-five by sixty feet in size. In addition to providing accommodation for about thirty-five students in design and other drafting courses, this room has a section devoted to the work of planning the college campus, over which the Department has supervision. In the basement—which is well lighted, owing to its hillside location—are the departmental library, and a large exhibition room used for the hanging and judging of student problems in design and other courses and for the occasional placing of special exhibitions.

The equipment of the Department, in addition to providing the usual and needed materials and facilities for teaching, includes a constantly increasing collection of lantern slides, which now numbers about three thousand. An herbarium, included as a part of the library, is also being increased in its number of specimens.

Meteorology

The Department of Meteorology is located on the fourth floor of Roberts Hall, and is maintained in cooperation with the United States Weather Bureau. This arrangement affords an unusual opportunity for students to acquaint themselves with the practical application of the science of meteorology to weather forecasting and to the study of local and general climatology in its relations with agriculture. The observatory is equipped with a full set of meteorological instruments, from which continuous observations are made. Reports are received by telegraph from about seventy-five weather stations in the United States, from which a daily weather map is made and forecasts are prepared. The departmental library, which, in addition to general works on meteorology, contains many publications bearing on the climate of various parts of the United States and of many foreign countries, is open to students.

Plant Breeding

This Department was organized in 1907, primarily for the experimental study of evolution. Its laboratory and offices are on the second floor of the Forestry Building.

The demand for instruction in plant breeding by students in the College became so great that a teaching division was established in 1908. This division has charge of undergraduate instruction. Graduate students engaged in research are closely associated with the experimental division and are allowed the advantages of its equipment. This equipment, including laboratory, greenhouses, and gardens, is designed primarily for investigation in experimental evolution.

The equipment of the teaching division is separate from that of the experimental division, except the plant-breeding library and a small part of the plant-breeding garden. It is designed to aid students in their study of variation, hybridization, and practical breeding.

The experimental laboratory is well supplied with suitable microscopes, microtomes, paraffin ovens, and the like, for use in histological investigations. It has also a full photographic outfit and calculating machines for the statistical study of variations. An excellent library, dealing with plant breeding and experimental evolution, and an extensive card catalogue of plant-breeding literature, form a part of the equipment. The private libraries of members of the staff, containing many valuable books and pamphlets, are placed at the disposal of graduate students. An herbarium of variations of plants is in process of formation. For conducting investigations during the winter, graduate students have the use of greenhouses provided with all necessary appliances for plant culture. For growing hybrids and other plants during the summer a garden of three acres is available. For more extensive plantings the Department has the use of parts of the university farms.

Plant Pathology

The Department of Plant Pathology is located in the basement of Bailey Hall. There are two elementary laboratories—each providing facilities for twenty-five students—a large room for research, an ample stock room well filled with necessary apparatus, and three small offices. The equipment of the laboratories and the offices consists of furniture especially built for the purpose, a complete set of

microscopes and accessories, cameras, a photomicrographic outfit, microtomes, incubators, sterilizers, ovens, reagents, and so forth, for teaching and investigation. An extensive collection of prepared slides and of photographs is available to students. There are also a growing collection and museum of pathological specimens, and a departmental library rich in classic works, monographic treatises, and phytopathological periodicals. Land and greenhouses are available for experimental and demonstrational work as well as for teaching. The Department is now in position to offer facilities for practically every line of work within its field.

Pomology

The Department of Pomology, organized in 1910, is well equipped for instruction. The classroom and the laboratory are on the second floor of Roberts Hall. There is also a fifty-acre field laboratory devoted to commercial and varietal orchards of the different fruits. Most of the plantings are young and offer excellent opportunities for practical work and demonstrations. On the grounds are also orchards of Paradise and Doucin stock, and a large collection of seedlings used for propagation.

The collection of spray machinery, including gas engines, traction outfits, and the like, is nearly complete, permitting thorough instruction in the practical methods of controlling orchard enemies.

Exceptional facilities are available for studying fruit varieties and packing. Each year a large assortment of fruit, which is used for purposes of instruction, is brought together at the College. The Department is equipped with a large number of new packing tables and presses.

The aim of the instruction is to train students for practical work, for experimental work, and for teaching. The courses cover in detail the preparation for all these fields.

Poultry Husbandry

The Department of Poultry Husbandry is located in the new Poultry Building, east of the greenhouses. Approximately one mile distant is the poultry farm, a tract of some eighty acres. Houses are to be erected immediately, north of the new Poultry Building, in order to provide room for instruction in feeding and rearing poultry.

The new Poultry Building is one hundred and thirty-two feet by forty-eight feet in area, and consists of three stories and a basement. It contains a killing-room, an egg-grading, -testing, and -marketing room, cold-storage facilities for commercial and experimental purposes, a lecture room seating three hundred persons, three laboratories for instruction and research, two recitation rooms, a seminary room, a photographic room, a library, and lockers for three hundred students. At the poultry plant are houses for about one hundred flocks, providing room for about twenty-five hundred fowls, ducks, and geese. These houses include thirty-four New York State gasoline-heated colony brooder-houses, and summer houses for rearing five thousand or more chickens annually.

The Poultry Producers' Association of Ithaca is conducting its work in the egg salesroom. This gives the students an opportunity to see the work of a cooperative organization of farmers.

Instruction is divided about equally between lectures, recitations, textbook study and required reading, and practice courses.

Lectures. For the lecture courses there are a large number of charts and models, eleven hundred and seventy lantern slides, and thirty-two hundred and fifteen negatives with blue prints.

Reading. Students have access to the library and reading-room of the Agricultural College and Experiment Station. There are also the poultry alcove in the University Library and the library in the Poultry Building, where the principal poultry books are kept and where more than one hundred poultry papers are on file. There is also a large card index of poultry literature.

Laboratory, shop, plant, and field practice. There is a commodious shop with a good collection of carpenter's tools. For laboratory and field practice there are available several sets of caponizing instruments of different makes, anatomical and drawing instruments, a model of a turkey and one of an egg during incubation, a collection of eggs of many varieties of poultry, twenty-five enlargements of different varieties of poultry from the American Standard of Perfection, cameras, balances, scales, models of poultry buildings and trap nests, killing instruments and appliances, a collection of packages for marketing poultry products, and samples of seventy kinds of poultry feeds. The students may observe and assist in the marketing of all eggs and poultry from the college plant and the Poultry Producers' Association.

Feeding and management. For this course fifty pens will be available. The pens contain thirty birds each, including thirteen leading varieties of fowl, four varieties of duck, and one variety of goose. There will be a large modern fattening-house fitted with suitable appliances. Record sheets are supplied, by means of which students show, at the end of the course, a complete history of the method of feeding and care, value of products, profit and loss, and the like, for their pens. Fattening crates and three styles of cramming-machines are provided, also five styles of bone cutters including a large power cutter, two gasoline engines, a power feed mill, a clover cutter, a root slicer, and other appliances.

Incubator practice. For the course in incubator practice there are thirty-five incubators, including many of the leading kinds, and three mammoth incubators each with a capacity of twenty-five hundred eggs. The incubator cellar is provided with modern conveniences for reading thermometers and for testing eggs. Record sheets show the method of operating the machine each day. There are hygrometers and thermographs for recording moisture and temperature.

Brooder practice. Two pipe-system brooder-houses and five types of brooders, including the gasoline-heated colony brooders, will be used.

Marketing practice. For this course, the student has the use of all apparatus and products of the sales division. The work includes the marketing of all poultry and products from the college plant, as well as some from the members of the Poultry Producers' Association. The six-ton refrigerating machinery with chilling-rooms, the freight elevators, and the candling apparatus are included in the equipment available.

Research. Many of the flocks at the plant are available for investigative work. Several private laboratories offer excellent facilities for research.

Rural Engineering

This Department is housed in the Rural Engineering Building, a temporary one-story structure forty by ninety-six feet in area, which provides laboratory space for the work in farm mechanics, stock room, and offices. Drafting-room space for the work in farm structures and the indoor work in farm engineering is provided in one of the other buildings of the College.

Equipment for the work in farm mechanics includes gasoline and kerosene engines, steam machinery, an electric-light plant, pumps, hydraulic rams, water-supply systems, plows, mowers, grain binders, separate binder attachments, and other implements and tools; together with a recording traction dynamometer for draft tests, and the sprayograph, a machine devised by the Department for testing spray nozzles. For the work in farm engineering the equipment includes twelve farm levels for elementary class work, and five levels and transits of precision for the use of advanced students and members of the staff in extension work in irrigation, drainage, and sanitary engineering throughout the State. Equipment for class work in farm structures includes three models of plank frame barns, to which there will soon be added a set of models illustrating the classification and development of barn frame trusses.

Soil Technology

The courses in soil technology are designed to afford the student in general agriculture an understanding of the fundamental principles of soil management for crop production, and also to offer opportunity for special study of important aspects of the subject, both general and specific. The former group includes a consideration of the processes of formation and classification of soils, their physical and chemical properties, and their modification by cultural operations. It is a summation of the general knowledge of soils. In the latter group, particular phases of the subject are taken up for advanced study, in lecture, research, and seminary.

The laboratory is equipped to accommodate one hundred and eighty students. The equipment includes apparatus for the study of the physical constitution of the soil, its capacity for retention and movement of water, its relation to the circulation of air, to heat, and to amount and effect of organic matter, and other important physical and chemical relations. Each student has the use of a desk and a locker containing a stock equipment, and of balances, microscopes, thermometers, mechanical analysis outfits, and other apparatus.

Large quantities of typical New York soil are available for study, and in addition there is a collection of samples of important type soils from all parts of the United States. The study of the soils of the United States may be supplemented by detailed maps of all areas surveyed to date.

The great variety of soils and soil conditions in the vicinity of Ithaca is made use of for field excursions in order to study their classification, occurrence, treatment, and management. All necessary equipment for the preparation of soil and drainage maps is provided to supplement the work in soil survey and land drainage. A collection of soil-working implements is available for study with reference to their efficiency of operation in soils of different characters and conditions.

For advanced study and investigation, special apparatus and special facilities are available, according to the subject under consideration.

Vegetable Gardening

The offices and classrooms of the Department of Vegetable Gardening are on the third floor of the Home Economics Building. Two glasshouses, one in the old range and one in the new vegetable range, comprising nearly four thousand square feet of space, together with a new head-house, are at the disposal of the Department. A block of sandy soil three acres in extent, equipped with tool house and irrigation, provides facilities for individual field laboratory work for students. The garden in Craig Field is used for experimental and demonstrational plantings and for the growing of an abundance of material for systematic studies. The produce of the gardens is marketed, thus giving an opportunity for laboratory work in this field.

The collections of preserved specimens and of herbarium material are well established and are being continually enlarged.

EXPENSES, FELLOWSHIPS, SCHOLARSHIPS, AND PRIZES

Tuition in the College of Agriculture is free to both graduate and undergraduate students who for a year or more immediately preceding admission have been residents of the State of New York. The annual tuition fee of students from outside the State is $125 for the first and second terms. The tuition charge for the third, or summer, term is $62.50.

The tuition is payable in two installments, $70 at the beginning of the first term and $55 at the beginning of the second term. For the third term the tuition of $62.50 is payable at the opening of the term. Other fees, required of all students, are as follows:

Matriculation fee	$ 5.00
Infirmary fee, each term	3.00
Fee for baccalaureate degree	10.00

Each student in the Department of Physical Culture is required to pay a fee of $2 a term.

Deposit fees are required in various laboratory courses; inquiry concerning these should be made before registration. Students are liable to a special charge for breakage or damage resulting from their own carelessness. Attention is called to the expenses of excursions required in various courses.

The expense for textbooks, instruments, and other necessary articles varies from $10 to $75 a year.

The University has converted the large general boarding-house known as Cascadilla Building into a dormitory for men students. The building is a four-story structure, just inside the main gate to the campus. The rooms are furnished, lighted, heated, and cared for. The rent for single rooms varies from $80 to $146 for the college year of two terms, depending on size and location. The rooms on the north side of the building are somewhat less in price than similar rooms on the south side. In case two men occupy a room, $45 should be added to the rent for the room. Many adjacent rooms connect and two adjoining rooms may be leased by two men if desired. For particulars communicate with the Treasurer, Cornell University, Ithaca, New York.

There are many private boarding- and rooming-houses near the university campus. In these the cost of board and furnished room, with heat and light, varies from $5 to $12 a week. By the formation of clubs, students are sometimes able to reduce their expenses for room and board.

The cost of board, with furnished room, laundry, fuel, and lights, in Sage College and Prudence Risley Hall, which are exclusively for women, varies from $290 to $320 per year. Both buildings are warmed by steam and lighted by electricity. The University Adviser of Women has jurisdiction over all women students in the University, and women students are not permitted to board and lodge outside the dormitories for women, unless for special reason approved by the Adviser and subject to her direction. Inquiry regarding board and rooms at Sage College or Prudence Risley Hall should be addressed to the Business Manager of Sage College, Ithaca, New York.

Scholarships and Fellowships in Agriculture

The Roberts scholarship fund, a gift of the late Dr. Charles H. Roberts, of Oakes, Ulster County, New York, provides five scholarships, each retainable for one year. As expressed by the founder, the purpose of these scholarships is to furnish financial assistance to students in the College of Agriculture who are of good moral character, who show native ability, tact, and application, and who are in need of such assistance, especially students who come from rural districts. The award is made after the close of the first term of each year. Application blanks and copies of the regulations may be obtained at the office of the Secretary of the College of Agriculture. All applications must be on the official blanks, which, with all other information, must be filed with the Secretary of the College before February 1, 1915. The value of each scholarship is $240.

Eighteen University Undergraduate Scholarships, continuing for two years and of an annual value of $200 each, are offered each year to members of the incoming freshman class. The award is made on the basis of a special competitive examination held in Ithaca in September between the period of the entrance examinations and the opening of the University. For a full description of these scholarships and examinations, see the General Circular of Information, which may be obtained from the Secretary of Cornell University.

Special attention is called to the new State Scholarships established by the Legislature of 1913. Under the terms of the law, five State Scholarships shall be awarded annually to each county for each assembly district therein. Such scholarships shall entitle the holder thereof to the sum of one hundred dollars annually during a period of four years when he is in attendance on an approved college in this State. The holder may use the money to meet expenses incurred in his college course. Regulations governing the award of these scholarships may be learned from the University of the State of New York, Albany, New York.

A graduate fellowship is awarded annually in Agriculture.

A number of industrial fellowships are established for a limited period, usually two years, by growers, companies, and the like, who wish to cooperate with the College of Agriculture in the solution of agricultural problems. These fellowships are given to men who from their training and experience are deemed competent to undertake the work.

The Eastman Prize for Public Speaking

With the object of developing qualities of personal leadership in rural affairs, Mr. A. R. Eastman, of Waterville, New York, has established an annual prize of $100 for public speaking on country-life subjects in the College of Agriculture. This prize is designated as the Eastman Prize for Public Speaking. Competition is open to any regular or special student. The contest will take place in February.

The Stewart Prize for Clean-Milk Production

With the object of increasing the interest in clean-milk production, Mr. S. L. Stewart, of Brookside Farm, Newburg, New York, has offered for the coming year a prize of $50 to be divided among students participating in a clean-milk contest. This money is to be apportioned by the Department of Dairy Industry and the regulations governing the contest are to be fixed by the Department. Definite announcement concerning the contest will be made to students taking Dairy Industry, course 6, soon after the course opens in February.

HONOR SYSTEM

With the consent of the faculty, examinations for agricultural students are conducted under the honor system, which is administered by a Committee on Student Honor. New students are given an opportunity to become thoroughly acquainted with the regulations of the system. The regulations are printed in the Handbook of Information for Students in the College of Agriculture, copies of which are available at the Secretary's office.

GENERAL INFORMATION CONCERNING COURSES

The regular instruction in the College of Agriculture constitutes a course of four years, or eight terms, leading to the degree of Bachelor of Science. There is a combined course with the State Veterinary College comprising six years and leading to two baccalaureate degrees (page 28). There is a Summer School in Agriculture, six weeks in length, designed especially for teachers, school principals and superintendents, and college students. Aside from these there are winter courses, not leading to credits in the University, and opportunities for students to pursue special work. Circulars describing the winter courses and the summer school may be obtained on application to the Secretary.

The third, or summer, term. The college year in Cornell University is divided into two terms, or semesters, extending from the last of September to the early part of June. In the College of Agriculture there has been established a third, or summer, term, which continues from early June until late September. It is coordinate with the present fall and spring terms. It is open only to students who have completed the required work of the freshman and sophomore years in Agriculture, or the substantial equivalent thereof. The primary purpose of the summer term is to take advantage of the growing season in teaching certain subjects to students regularly registered in either graduate or undergraduate courses. The facilities of the College are available for graduate study throughout the summer. In addition, opportunity is provided for advanced students, teachers, and others who are otherwise engaged during the regular school year, to have the advantage of a long period of special instruction.

Students may pursue agricultural subjects in the Graduate School of the University. For full information concerning graduate work and degrees, see the Announcement of the Graduate School.

The Regular Four Year Course

Men who are candidates for admission to the regular, or four year, course must be at least sixteen years of age; women must be at least seventeen years of age. They must have certificates of good moral character, and students from other colleges or universities are required to furnish from those institutions certificates of honorable dismissal. Students are admitted on examination, or on presenting credentials of the University of the State of New York, or on acceptable school certificates.

Prospective students who have neither lived on farms nor had considerable practical experience in agriculture are urged to spend at least one year on a well-managed farm in order to familiarize themselves with common farm affairs and operations before entering the College. This experience is imperative in order to pass the farm-practice requirements. *(Pages 26 and 44.)*

Candidates for admission must file their credentials and obtain permits for examination at the University Registrar's office, Morrill 10. The results of examination may be ascertained from the Registrar.

Entrance Requirements of Four Year Course

The subjects that may be offered for admission to Agriculture are named in the following list; the figure in parenthesis following each subject indicates its value in units and shows the maximum and the minimum amount of credit allowed in the subject. A unit represents five recitations a week for one year in a study.

1a.	English A	(2)	
1b.	English B	(1)	
2a.	First Year Greek	(1)	
2b.	Second Year Greek	(1)	
2c.	Third Year Greek	(1)	
3a.	First Year Latin	(1)	
3b.	Second Year Latin	(1)	
3c.	Third Year Latin	(1)	
3d.	Fourth Year Latin	(1)	
4a.	First Year German	(1)	
4b.	Second Year German	(1)	
4c.	Third Year German	(1)	
5a.	First Year French	(1)	
5b.	Second Year French	(1)	
5c.	Third Year French	(1)	
6a.	First Year Spanish	(1)	
6b.	Second Year Spanish	(1)	
6c.	Third Year Spanish	(1)	
7a.	First Year Italian	(1)	
7b.	Second Year Italian	(1)	
7c.	Third Year Italian	(1)	
8a.	Ancient History	(½–1)	
8b.	Modern History	(½–1)	
8c.	Am. History, Civics	(½–1)	
8d.	English History	(½–1)	
9a.	Elementary Algebra	(1)	
9b.	Intermediate Algebra	(½)	
9c.	Advanced Algebra	(½)	
9d.	Plane Geometry	(1)	
9e.	Solid Geometry	(½)	
9f.	Plane Trigonometry	(½)	
9g.	Spher. Trigonometry	(½)	
10.	Physics	(1)	
11.	Chemistry	(1)	
12.	Physical Geography	(½–1)	
13.	Biology*	(1)	
14.	Botany*	(½–1)	
15.	Zoology*	(½–1)	
16.	Agriculture†	(½–4)	
17.	Drawing	(½–1)	
18.	Manual Training	(1)	
19.	Any high school subject or subjects not already used	(½–1)	

*If an applicant has counted Biology (1) he may not offer Botany (½) or Zoology (½).

†An applicant may offer for admission to Agriculture not to exceed four units in vocational subjects under numbers 16, 18, and 19 combined.

For admission to the New York State College of Agriculture, an applicant must offer either A or B as below:

A. Fifteen units arranged as follows: English (3), history (1), elementary algebra A (1), plane geometry (1), a foreign language* (3), elective (6). Solid geometry and plane trigonometry are recommended among the elective units for students entering for forestry or landscape art.

B. The Arts College Entrance Diploma or the Science College Entrance Diploma issued by the University of the State of New York.

Requirements for Admission of Special Students

Opportunities are provided for persons who desire to pursue special studies. In order to be eligible for admission to special work, applicants must offer two full years of recent farm experience and must also either have fifteen units of entrance credits or be twenty-one years of age. An applicant for admission on the age requirement must satisfy the faculty of his ability to perform the work; and every applicant must satisfy the faculty of his bona fide desire for special study. He will be required to present an honorable dismissal from the school last attended, certificates of good moral character, and such other certificates and letters as may be desired. The special work is designed to meet the needs of young men and young women from farms who have not time for a four year course, and of mature persons who desire to spend a brief period in specialized study. The work is not a definite "course" in the sense of having a program or a prescribed set of studies. The student chooses any of the agricultural "electives" that he is fitted to pursue. Certain courses are given by some of the departments for students who lack some of the fundamental work usually required in those subjects. Admission as a special student does not admit to classes. The student is admitted to the various classes by the heads of the departments concerned.

Other Details of Admission

For other details as to subjects and methods of admission, see the General Circular of Information, which may be obtained on application to the Secretary, Cornell University, Ithaca, New York.

For admission to the freshman class and to advanced standing from other colleges and universities, all communications should be addressed to the Registrar of the University. See the General Circular of Information.

For admission as a special student, communications should be addressed to the Secretary, College of Agriculture, and attention is called to the paragraphs on pages 27 and 28 of the General Circular of Information.

For admission to graduate work and candidacy for advanced degrees, communications should be addressed to the Dean of the Graduate School.

Requirements for the Degree of Bachelor of Science

The requirements for the degree of Bachelor of Science shall be residence for eight terms, and, in addition to the prescribed work in the Department of Physical

*French or German is recommended for entrance. For the Graduate School requirement with reference to a reading knowledge of French and German, see page 5 of the Announcement of the Graduate School.

Culture and of Military Science and Tactics, the completion of one hundred and twenty hours of required and elective work as outlined on pages 27–28.

Credit toward a degree for work done in a preparatory school on subjects that may be offered for entrance to the University will be given to those students only who, in addition to satisfying all entrance requirements, pass separate examinations in the subjects for which they seek college credit. These examinations will cover substantially the same ground as the university courses in the subjects. An applicant desiring a college-credit examination of this kind must apply to the Registrar as early as possible, and in no case later than September 10, 1914, specifying which fifteen units he intends to offer in satisfaction of the entrance requirements, and on what other entrance subjects he wishes to be examined for credit. In case he fails to satisfy the entrance requirements in any one or more of the units on which he has proposed to enter, but passes the credit examination in any other subject or subjects, he may use the latter toward satisfying entrance requirements, but in that case he cannot also receive college credit for it. The college-credit examinations will be held in September, on the dates set for the entrance examinations in the same subjects.

A student who receives at entrance twelve or more hours of credit in addition to the requirements for admission, may be regarded as having satisfied one term of residence. Under no circumstances shall surplus entrance credit be accepted as the equivalent of more than one term.

A student who has satisfied the entrance requirements of this College, and has afterward completed in two or more summer sessions in Cornell University at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in summer sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit toward the degree of Bachelor of Science which is allowed for the work of any one summer session is seven hours.

A student admitted to the College of Agriculture from another college in Cornell University, or from any other institution of collegiate rank, will be regarded as having completed the number of terms and hours to which his records entitle him, and will receive all the privileges of students who have completed the same number of terms and hours by residence in the College. In order, however, to obtain the degree of Bachelor of Science, he must have completed the prescribed subjects in the four year course and the requisite number of elective hours in agricultural subjects. He must also have been in residence in the College of Agriculture for at least two consecutive terms and have completed not less than fifteen hours a term, of which two-thirds, at least, must be subjects taught by the staff of the College of Agriculture.

A student must register for at least twelve hours each term and no new student may register for more than eighteen hours. Maximum registration by old students is determined on the basis of record.

All men students, except those whose record and registration at the beginning of the senior year show that they are specializing to the extent of fifteen hours in home economics, forestry, landscape art, or entomology, must fully satisfy, before the beginning of the senior year, the requirements in farm practice. All men students are required to report to the Department of Farm Practice within the first three weeks of the first term in the College.

Regular students may take at their discretion during their four years not to exceed twenty hours of elective subjects in courses offered in other colleges than Agriculture; but such elective subjects shall not interfere with required or back work. Special students must take at least two-thirds of the entire work of each year from the agricultural subjects described on the following pages.

The Course Leading to the Degree of Bachelor of Science*

Freshman year	Number of course	Hours 1st term	Hours 2d term
English	1	4	4
Chemistry	1	6	–
Chemistry	85 or 6	–	4 or 5
Biology	1	3	3
Physics**	2	–	5
The Farm	1	2	–
Electives†		0–3	4–7
Total		15–18	15–18

Sophomore year	Number of course	Hours 1st term	Hours 2d term
Geology‡	1	3	–
Chemistry	85	–	4
Physiology, one of the following§:			
Physiology of domestic animals	12	–	3
Human physiology	3	–	3
Plant physiology	20 or 21	–	4
Botany or Zoology	1	5	–
Zoology	1	5	–
Electives		7–10	6–11
Total		15–18	15–18

In addition to the above, the required work in military drill and physical training must be taken.

Political Science 51 may be taken during this year.

Junior year	Number of course	Hours 1st term	Hours 2d term
Political Science	51	3	3

Elective Subjects and Group Requirements

The remainder of the work is made up of electives to be taken under the following restrictions:

A student may take at his discretion during his four years not to exceed twenty hours of elective subjects in courses offered in other colleges than Agriculture;

*The required courses given in other colleges than Agriculture are announced on pages 69–70.
**May be taken in second term of sophomore year.
†Professional students in forestry who do not offer solid geometry and plane trigonometry for entrance are required to take these subjects in their freshman year.
‡Optional for students taking a major in home economics.
§May be taken in junior or senior year by special permission.

but such elective subjects shall not interfere with required or back work. The remainder of his elective work must be offered from the agricultural subjects described on the following pages.

In selecting the subjects in the major group in Agriculture, the student must obtain the advice and approval of a professor or an assistant professor having charge of a subject within the group and preferably within the department in which he expects to specialize, who shall be chosen by the student at the beginning of the sophomore year. Students expecting to specialize in forestry, landscape art, rural education, or home economics must take as their advisers professors or assistant professors in those departments.

All students must have passed before graduation at least fifteen hours of agricultural electives in one of the groups named below and at least three hours in each of three of the other groups:

Group A—Farm Crops
- Pomology
- Soil Technology
- Floriculture
- Vegetable Gardening

Group B—Animal Husbandry
- Poultry Husbandry
- Dairy Industry
- Entomology

Group C—Agricultural Chemistry
- Botany
- Plant Breeding
- Plant Pathology
- Meteorology

Group D—Rural Economy
- Farm Management
- Extension
- Rural Engineering
- Drawing

Group E—Forestry
- Home Economics
- Landscape Art

Combined Course in Agriculture and Veterinary Medicine

A regular student who has satisfactorily completed all the required work of his course and who has a credit of at least ninety hours may, with the permission of the faculties concerned, be registered both in the College of Agriculture and in the New York State Veterinary College, and on the completion of thirty hours, of which not less than twelve hours shall be taught in the New York State College of Agriculture, may be recommended for his degree. On the completion of the remaining two years, if he meets the requirements of the State Veterinary College, he will receive the degree of Doctor of Veterinary Medicine.

DEPARTMENTS OF INSTRUCTION

WITH OUTLINES OF COURSES THAT MAY BE CHOSEN BY REGULAR OR SPECIAL STUDENTS AS AGRICULTURAL ELECTIVES

ELECTIVE COURSES OPEN TO FRESHMEN

Dairy Industry 1, 2, 3, 4, 6, 10, 11; Floriculture 1, 9; Forestry 6; Landscape Art 2, 3, 13; Meteorology 1; Nature Study 1, 2; Rural Economy 1; Rural Engineering 3, 4, 20, 30; Vegetable Gardening 1.

SPECIAL NOTICE

The first term begins with the opening of the college year in September. The second term begins in February. The third, or summer, term begins in June. (See Calendar, page 2.) The terms are all coordinate.

Unless otherwise noted, all courses are given in the buildings of the College of Agriculture. Courses enclosed in brackets will not be given in 1914–15.

AGRICULTURAL CHEMISTRY

Instruction is given in Morse Hall

85. **Agricultural Chemistry.** First or second term, credit four hours. Prerequisite Chemistry 1. Lectures, T Th S, 11. Recitations: first term, T, 8, or Th or F, 9; second term, M, W, Th, or F, 8, T, 10, or F, 9. Morse Hall, Lecture Room 1. Professor CAVANAUGH, and Messrs. RICE and CONLIN.

A general course treating of the relations of chemistry to agriculture and dealing with the composition and chemical properties of plants, soils, fertilizers, feeding-stuffs, insecticides, and fungicides.

85a. **Agricultural Chemistry, Laboratory Course.** First or second term, credit two hours. Prerequisite Chemistry 1, 6, and 85. T Th, 2–4.30. Morse Hall, Quantitative Laboratory. Professor CAVANAUGH and Mr. RICE.

This course is designed to accompany course 85. Laboratory deposit, $15, part returnable.

86. **Agricultural Chemistry, Advanced Course.** First term, credit two hours. Prerequisite course 85a. Lectures, T Th, 9. Morse Hall, Lecture Room 4. Professor CROSS.

The methods of the Association of Official Agricultural Chemists are studied in the analysis of fertilizers, soils, and insecticides.

87. **Agricultural Chemistry, Laboratory Course.** First term, credit three hours. T Th, 2–5, and S, 9–12. Morse Hall, Quantitative Laboratory. Professor CROSS and Mr. RICE.

This course is designed to accompany course 86. Laboratory deposit, $20, part returnable.

88. **Agricultural Chemistry, Laboratory Course.** Second term, credit three hours. T Th, 2–5, and S, 9–12. Morse Hall, Quantitative Laboratory. Professor CROSS and Mr. RICE.

This course is designed to accompany course 89. Laboratory deposit, $20, part returnable.

89. **Agricultural Chemistry, Advanced Course.** Second term, credit two hours. Prerequisite course 85a or 93. Lectures, T Th, 9. Morse Hall, Lecture Room 4. Professor CROSS.

The methods of the Association of Official Agricultural Chemists are studied in the analysis of foods, feeding-stuffs, sugars, and dairy products.

90. **Advanced Agricultural Analysis.** First or second term. Prerequisite courses 86 and 87 or 88 and 89. Credit and hours by appointment. Professor CAVANAUGH or Professor CROSS.

This course is designed to meet the needs of those who wish to do research in agricultural chemistry.

91. **Elementary Agricultural Chemistry.** First term, without credit toward graduation. Open only to special students. Lectures, M W F, 8. Morse Hall, Lecture Room 1. Mr. RICE.

92. **Household Chemistry.** Second term, credit two hours. Prerequisite Chemistry 1, 6, and 32. Lectures, W F, 9. Morse Hall, Lecture Room 2. Professor CAVANAUGH.

This course is designed for students in home economics.

93. **Household Chemistry, Laboratory Course.** Second term, credit three hours. T Th S, 8–10.30. Morse Hall, Quantitative Laboratory. Professor CAVANAUGH and Mr. RICE.

This course is designed to accompany course 92. Laboratory deposit, $20, part returnable.

ANIMAL HUSBANDRY

1. **Principles and Practice of Feeding Animals.** First or second term, credit two hours. Lectures, F, 9. Animal Husbandry Building A. One practice period a week, daily except S, 2–4.30, by appointment. Animal Husbandry Building. Professor SAVAGE and assistants.

The general principles of animal nutrition, including the study of feeding standards, the common grain and commercial feeds, the formulation of rations, and the like.

2. **Principles of Animal Breeding.** First or second term, credit two hours. Lectures, T Th, 9. Animal Husbandry Building A. Professor WING and assistants.

A general outline of the principles of heredity as applied to the breeding of animals, with a study of animal form, origin and formation of breeds, crossing, and grading; an outline of the methods of registration; and the study of records and pedigrees. Demonstrations, essays, and reports will be required as supplementary to the lectures.

3. **Stock Judging, Elementary Course.** First term, credit one hour. Practice, T, W, or Th, 3.30–5. (Additional sections will be formed if necessary.) Judging Pavilion. Professors WING and HARPER, and Mr. BAIN.

Elementary practice in judging horses, cattle, sheep, and swine.

5. **The Horse.** Second term, credit four hours. Lectures, M W F, 11. Animal Husbandry Building A. Practice, M, W, or Th, 2–5. Judging Pavilion. Professor HARPER and assistants.

History and characteristics of breeds, selection, judging, breeding, feeding, care, training, and development of the horse.

6. **Horse Training, Practical Course.** First term, credit two hours. Prerequisite course 5; registration limited, admission by permission only. Lectures, F, 9. Animal Husbandry Building. Practice, in sections by appointment. Animal Husbandry Building and barns. Professor HARPER and assistants.

A practical course in the feeding, training, and stable management of horses.

7. **Mechanics of the Horse.** First term, credit three hours. Will not be given unless elected by at least five students. Prerequisite course 5. Lectures and recitations, M W, 11. Practice, M, 3.30–5. Animal Husbandry Building. Professor HARPER.

Lectures on animal mechanics, animal proportions, and the relation of the latter to specific uses. Practice in measuring animals and in testing the value of given measurements for given purposes.

10. **Dairy Cattle.** First term, credit four hours. Lectures, M W, 9. Practice, M, W, Th, or F, 2–3.30, by appointment; also, daily attendance at the barns for practice in feeding and stable management for three weeks, in groups as assigned. Animal Husbandry Building A, Judging Pavilion, barns, and stables. Professor WING, Mr. ZIMMER, and assistants.

Origin, history, and development of the breeds of dairy cattle; production of milk; economy of feeding, care, management, and sanitation of the dairy herd; maintenance of the herd; raising calves. Practice in judging, scoring, milking, and feeding.

11. **Beef Cattle, Sheep, and Swine.** First term, credit three hours. Lectures, T Th, 11. Practice, T, 2–3.30, or S, 10.30–12. Animal Husbandry Building A. Professors WING and HARPER, and assistants.

Origin, history, and development of the breeds of beef cattle, sheep, and swine; methods of beef, mutton, and pork production, especially as based on the results of experiments. Practice in judging beef cattle, sheep, and swine. Reports on topics assigned will also be required.

12. **Meat and Meat Products.** First or second term, credit two hours. Practice, in sections by appointment. Animal Husbandry Building. Professor WING and assistants.

A practical course in slaughtering farm animals and the preparation and curing of meat.

15. **Principles of Feeding, Advanced Course.** Second term, credit two hours. Prerequisite course 1. For advanced and graduate students. Lectures, M, 9. Practice, hours to be assigned. Animal Husbandry Building. Professor SAVAGE.

16. **Principles of Breeding, Advanced Course.** First and second terms, credit one to three hours a term. Prerequisite courses 5 and 10. Lectures, M, 10. Animal Husbandry Building. Professors WING and HARPER.

Lectures, conferences, and reports, including statistical methods as applied to breeding animals. The work of the first term will consist in large part of practice in making reports on statistical problems; the work of the second term will be chiefly individual and will afford opportunity for intimate and close study of the various breeds of improved stock.

17. **Animal Husbandry, Advanced Course.** Research, investigation, and practice, for advanced and individual work. Hours to be assigned. Animal Husbandry Building. Professor WING and assistants.

Students intending to specialize in animal husbandry are advised to register for courses 1, 2, and 3, before taking the more advanced courses.

BOTANY

1. **General Botany.** First term, credit five hours. Lectures, M, 9 or 11. Dairy Building 222. Recitation, one hour, by appointment. Laboratory and field work, three periods of two and one-half hours each, by appointment. Students must consult the department in regard to laboratory and recitation appointments before registering for the course. Professor WIEGAND, Doctor EAMES, Messrs. THOMAS, MACDANIELS, SHARP, METCALF, SEVERY, Mrs. WIEGAND, Miss HANCY, and others.

This course is designed to furnish a general knowledge of the fundamental facts and principles of plant life. The plant as a living organism will be considered from the point of view of general structure, variability, adaptation, function of parts, life processes, evolution, and distribution. A part of the time will be spent in becoming acquainted with the commoner wild and cultivated species and with the larger natural groups of plants. As much field work as is practicable will be introduced. Laboratory fee, $4.

2. **Forest Botany.** First term, credit three hours. Prerequisite course 1 or its equivalent. Lectures or conferences, T, 8. Forestry Building 126. Labora-

tory or field work, T Th, 2–4.30. Agronomy Building, Botanical Laboratory. Doctor EAMES.

A course dealing with the identification of trees and shrubs, both in summer and in winter, and with other problems relating to forest plants. Adapted to all students wishing a technical knowledge of trees and shrubs. Laboratory fee, $2.50.

6. **Taxonomy of the Higher Plants.** Second or third term, credit four hours. Prerequisite course 1 or its equivalent. Lectures, W, 9. Agronomy Building 192. Laboratory: Second term, W F, 2–4.30. Agronomy Building, Botanical Laboratory. Professor WIEGAND and Mr. ———. Third term, T Th, 2–4.30. Agronomy Building, Botanical Laboratory. Doctor EAMES and Mr. ———. Field work by appointment.

Identification, classification, and ecology of the seed plants and ferns: a detailed study of the local flora about Ithaca with reference to the recognition of species and varieties, classification and scientific nomenclature of these forms, their floral and foliar characteristics, and so forth. The course consists largely of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological associations and modifications of the various species and varieties will be noted. Instruction will be given in the preparation of an herbarium and in the preparation of keys. Laboratory fee, $3.50.

9. **Histology.** Third term, credit four hours. Prerequisite course 1 or its equivalent. Lectures, T, 11. Laboratory, T Th S, 8–10.30. Agronomy Building, Botanical Laboratory. Doctor EAMES and Mr. ———.

This course is designed to give a knowledge of the structure and morphology of plant tissues and organs. Emphasis will be placed on the relation of structure to function, and on the modifications due to phylogenetic development and to ecological factors. Traumatic and pathogenic tissues, and the effect of parasitism, symbiosis, and other factors on the various tissues, will be studied. Laboratory work will include methods and practice in microtechnique. Laboratory fee, $5.

10. **Cytology.** Second term, credit three hours. Prerequisite course 1 or its equivalent. Lectures, F, 8. Laboratory, T Th, 10–12.30. Agronomy Building, Botanical Laboratory. Doctor SHARP.

This course is planned to give instruction in the morphology and physiology of the cell and of reproduction and inheritance. Microtechnique will be given special attention. Laboratory fee, $4.

20. **General Plant Physiology.** First or second term, credit four hours. Prerequisite all freshman work or its equivalent, and course 1. This course may be taken to satisfy the requirement in physiology. Assistant Professor KNUDSON, and Messrs. ROBBINS, CURTIS, and NANZ. First term: Lectures, T, 10. Roberts Hall 292. Recitations, two sections, Th, 10. Roberts Hall 292, Agronomy Building 21. Laboratory: sec. I, T Th, 2–4.30; sec. II, W F, 2–4.30. Agronomy Building 21. Second term: Lectures, T, 10. Roberts Hall 292. Recitations, four sections, Th, 10. Roberts Hall 292, Agronomy Building 21, Agronomy Building 192, Home Economics Building 100. Laboratory: sec. I, M, 8–11, Th, 11–1; sec. II, M, 11–1, W, 10–1; sec. III, T Th, 2–4.30; sec. IV, W F, 2–4.30. Agronomy Building 21.

The topics include absorption, nutrition, relations to environment, growth, reproduction, and propagative processes. Laboratory fee, $5.

21. **Plant Physiology, Advanced Course.** First and second terms, credit five hours a term (see note). Prerequisite training in botany and chemistry, to be determined in each case by the instructor; recommended for the junior or the senior year. Lectures, W F, 10. Agronomy Building 192. Laboratory, M, 2–5, S, 8–11. Agronomy Building 21. Assistant Professor KNUDSON, and Messrs. ROBBINS and CURTIS.

Lectures, laboratory practice, and reports. This is a comprehensive course in physiology and requires good fundamental preparation on the part of the student.

The course is designed for students specializing in plant study, including the applied lines. Laboratory fee, $6 a term.

NOTE: This course is also given during the third term. It is then divided, however, into two five-hour courses, the student being permitted to take either course or both.

26. **Physiology of Fermentation.** First term, credit three hours. Prerequisite required work through the sophomore year, bacteriology, and course 20 or 21. Lectures, T, 12. Agronomy Building 192. Laboratory by appointment. Agronomy Building 21. Assistant Professor KNUDSON and Mr. ROBBINS.

A course in technical microbiology in its relation to fermentation. The course deals primarily with yeasts, molds, and bacteria that are concerned in the more important fermentation processes. Recommended for graduates and for undergraduates who are specializing in physiological, bacteriological, or pathological work. Laboratory fee, $5.

Courses intended primarily for graduates

18. **Research in General Botany, Histology, and Taxonomy.** Throughout the year. Not less than three hours a term, by appointment. Professor WIEGAND.

A course designed for graduates and advanced students. Original investigation by students who are adequately prepared. The laboratory fee depends on the nature of the work.

19. **Seminary in Taxonomy, Morphology, Cytology, and Histology.** Throughout the year, credit one hour a term. Credit restricted to graduate students in the Department. Hours to be arranged. Professor WIEGAND.

Broad problems pertaining to botany will be discussed, literature will be reviewed, and reports of research will be given.

30. **Special Chapters in Metabolism.** Third term, credit one hour or more. Lectures and laboratory. Assistant Professor KNUDSON.

A study of some of the more important temporary and storage products of plant metabolism. Open only to graduates, or to undergraduates who have had course 21 and organic chemistry.

31. **Seminary in Plant Physiology.** Throughout the year, credit one hour a term. Limited to graduates taking work in the Department. Conferences, F, 11. First term, Home Economics Building 100; second and third terms, Agronomy Building 192. Assistant Professor KNUDSON.

During the first and third terms, topics will be chosen from current work in plant physiology. During the second term, special outlines will be followed and reports on research studies presented.

33. **Research, General Physiology.** Throughout the year. Credit for major or minor, otherwise not less than four hours a term. Prerequisite adequate training in botany, chemistry, and physiology. By appointment. Agronomy Building 101. Assistant Professor KNUDSON.

34. **Research, Cell Physiology.** Throughout the year. Credit for major or minor, otherwise not less than four hours a term. Prerequisite adequate training in botany and physiology. By appointment. Agronomy Building 101. Assistant Professor KNUDSON.

In courses 33 and 34, problems in plant physiology (including ecology, cytology, and heredity) and in the general relation of plant physiology to agriculture will be assigned for investigation. Reports or theses will be required. The amount of the laboratory fee is governed by the nature of the work.

DAIRY INDUSTRY

1. **Milk Composition and Tests.** First, second, or third term, credit three hours. For regular students only. Students must consult the Department in

regard to laboratory assignments before registering for the course. First term: lectures, T S, 11, Dairy Building 222; practice, M, 8–10.30 or 2–4.30, T, 2—4.30, or S, 8–10.30, Dairy Building 232. Second term: lectures, T S, 11, Dairy Building 222; practice, M, W, or F, 2–4.30, or W, 8–10.30, Dairy Building 232. Professor TROY and Mr. JONES. Third term: lectures, T S, 11, Dairy Building 222; practice, T, 2–4.30, Dairy Building 232. Professor ROSS and Mr. MCINERNEY.

The topics considered are secretion and composition of milk, samples, the lactometer, the Babcock test for fat, acid tests, moisture tests, salt tests, preservative tests, and adulterations. Laboratory deposit, $3, part returnable.

2. **Butter Making.** First term, credit three hours. Must be preceded or accompanied by course 1; should be preceded or accompanied by courses 4, 6, and 8; for regular students only. Lectures, F, 11. Dairy Building 222. Practice, T or F, 1–6, or S, 8–1. Dairy Building. Professor GUTHRIE and Mr. SCOVILLE.

This course considers the principles and practice of butter making in farm dairies and creameries, cream separation, pasteurization, starters, cream ripening, churning, marketing, and the like. Laboratory deposit, $2, part returnable.

3. **Cheese Making.** First term, credit three hours. Must be preceded by course 1 or 16; should be preceded or accompanied by course 8. Lectures and recitations, Th, 11. Dairy Building 222. Practice, M, W, or Th, 1–6. Cheese Laboratory. Assistant Professor FISK and Mr. ELLENBERGER.

In this course are considered the principles and practice of cheddar-cheese making, starter making, buildings and equipment, factory bookkeeping, judging, and marketing. Laboratory deposit, $2.50, part returnable.

4. **Bacteriology, Elementary Course.** First term, credit three hours. For regular students only, except by special permission. Lectures will be given in connection with the laboratory practice, M W F, 2–4.30. Students must consult the Department in regard to laboratory assignments before registering for the course. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, M, 10–1, W F, 8–11.) Dairy Building 122. Professor STOCKING, Messrs. PICKERILL and SUPPLEE, and Miss GENUNG.

The purpose of this course is to familiarize the student with laboratory methods, preparation of culture media, sterilization, methods of studying bacteria, and morphology and cultural characteristics of bacteria. Laboratory deposit, $3, part returnable.

Dairy Mechanics. See Rural Engineering 4.

6. **Market Milk and Milk Inspection.** Second term, credit two hours. Must be preceded or accompanied by course 1 or 16; should be preceded or accompanied by courses 4 and 8. Lectures, W, 12. Dairy Building 222. Practice, S, 8–10.30 or 10.30–1. Dairy Building. Professor ROSS and Mr. MCINERNEY.

Attention is given to the production and control of market milk, with special reference to its improvement; milk as food; shipping stations; transportation and sale; pasteurizing; standardizing; certified milk; milk laws; duties of milk inspectors; apparatus and buildings. The practice includes also visits to dairies in the vicinity of Ithaca. A required two-days inspection trip in the neighboring counties will be arranged. Laboratory deposit, $3, part returnable.

7. **Testing, Advanced Course.** Second term, credit two hours. Must be preceded by course 1; not open to first- and second-year students, except by special permission. Laboratory will not accommodate more than fifteen men. Students must consult the Department in regard to laboratory assignments before registering for the course. T Th, 2–5. Dairy Building 202. Professor TROY and Mr. JONES.

This course includes work in such subjects as the determination of moisture and dry matter in dairy products; commercial tests for casein; various tests for butter-fat; commercial tests for butter and oleomargarine; preservatives and adulterations; milk modification. Laboratory deposit, $3, part returnable.

8. **Dairy Bacteriology.** Second term, credit four hours. Must be preceded or accompanied by course 1, and preceded by course 4 or its equivalent; open to

regular students only. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, Th, 11. Dairy Building 222. Practice, M W F, 2–4.30. Dairy Building 122. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, T Th S, 8–10.30.) Professor STOCKING, and Messrs. PICKERILL and SUPPLEE.

This course deals with the sources of milk bacteria and methods of controlling their growth; bacteriological studies of market milk and other dairy products; different species of dairy bacteria; the making of starters; effect of straining; separation, pasteurization, and temperature; bacteriological methods of city milk inspection. Laboratory deposit, $4, part returnable.

9. **Butter Making, Advanced Course.** Second term, credit three hours. Must be preceded by a good record in course 2. (In special cases students who have done exceptionally good work in course 18 may be admitted.) Lectures, F, 12. Dairy Building 222. Practice, one long period each week by appointment; the periods will begin at the opening of the creamery in the morning and will close at 12 o'clock. Dairy Building. Professor GUTHRIE.

Attention will be given to creamery management; creamery records and accounts; organization; location, plans, and construction of creamery buildings. Outside reading will be required. The practice will consist of practical work in the creamery, where six hundred to one thousand pounds of butter are made daily. The work will include receiving milk and cream; separating; ripening cream; starter culture; the manufacture, wrapping, packing, and judging of butter. A required trip to near-by creameries will be arranged. Laboratory deposit, $2, part returnable.

10. **Fancy Cheese.** Second term, credit two hours. Must be preceded by course 1 or 16 and course 3. Practice, T or W, 1–6. Dairy Building 132. Assistant Professor FISK and Mr. ELLENBERGER.

The manufacture of certain brands of fancy cheese is given attention in the course. Laboratory deposit, $2, part returnable.

11. **Ice-cream Making.** Second term, credit two hours. Must be preceded by course 1 or 16, and course 14 or its equivalent. Lectures, M, 8. Dairy Building 222. Practice, M, 2–4.30. Dairy Building E 122. Assistant Professor FISK and Mr. ELLENBERGER.

The topics considered are the manufacture of different kinds of ice cream and sherbets, and types of machinery used. Laboratory deposit, $2, part returnable.

12. **Seminary.** First or second term, credit one hour. For advanced students; required of graduate students taking work in the Department. T, 4.30–5.30. Dairy Building. Professors STOCKING, ROSS, TROY, and GUTHRIE, and Assistant Professor FISK.

13. **Research.** First or second term, credit one or two hours, by arrangement. For advanced students. Practice, hours by appointment. Dairy Building. Professors STOCKING, ROSS, TROY, and GUTHRIE, and Assistant Professor FISK.

Special problems in any line of dairy work can be taken up in this course according to the needs of the student. Facilities are provided for investigative work. Laboratory deposit, $2 an hour, part returnable.

14. **General Agricultural Bacteriology.** First term, credit three hours. Open to regular and special students who desire a general knowledge of bacteria in relation to agricultural problems, but cannot spend time for the more thorough courses. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, F, 10. Dairy Building 222. Practice, T Th, 2–4.30. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, T Th, 8–11.) Dairy Building 122. Professor STOCKING, Messrs. PICKERILL and SUPPLEE, and Miss GENUNG.

The characteristics of bacteria, their distribution and place in nature; fermentations; bacteria in air, water, and sewage; the manure heap; soil bacteria; nitrogen fixation; relation of bacteria to the dairy and its products; the preserva-

tion of farm products, including fruits, vegetables, vinegar, silage. Laboratory deposit, $3, part returnable.

15. **Bacteriology for the Home.** Second term, credit three hours. This course is intended for students in home economics. Students must consult the Department in regard to laboratory assignments before registering for the course. Lectures, S, 11. Home Economics Building 245. Practice, T Th, 2–5. (If registration exceeds the capacity of the laboratory a second set of sections will be arranged, W F, 10–1.) Dairy Building 122. Messrs. PICKERILL and SUPPLEE, and Miss GENUNG.

This course considers the nature of bacteria and methods of studying them; the relation of bacteria to air, and to water, milk, and other foods; canning and preserving; molds and yeasts in their relation to household problems; decay of fruits; house sanitation. Laboratory deposit, $4, part returnable.

16. **Milk Composition and Tests.** Second term, two hours, without credit toward graduation. Similar to course 1; for special students only. Lectures, W, 11. Dairy Building 222. Practice, S, 8–10.30. Dairy Building 232. Professor TROY and Mr. JONES. Laboratory deposit, $3, part returnable.

18. **Butter Making.** Second term, three hours, without credit toward graduation. Must be preceded or accompanied by courses 6 and 16; for special students only. Lectures, F, 11. Dairy Building 222. Practice, F, 1–6. Dairy Building. Professor GUTHRIE and Mr. SCOVILLE. Laboratory deposit, $2, part returnable.

19. **Cheddar-cheese Making, Advanced Course.** Second term, credit two hours. Prerequisite a good record in course 3. Lectures and outside reading in connection with laboratory work. Practice, one long period each week, T or Th; each exercise will begin at 11 o'clock and close when the work is done. Cheese Laboratory. Assistant Professor FISK.

This course considers some of the commercial and scientific problems of cheddar-cheese making, starter making, judging, and marketing. A required trip to near-by cheese factories will be arranged. Laboratory deposit, $2, part returnable.

DRAWING

1. **Mechanical Drawing.** First or second term, credit three hours. Students must register for not less than three hours. Lectures during practice. Practice, M W, 2–4.30, or T Th, 2–4.30. Two remaining two-hour practice periods by appointment. Dairy Building 341. Mr. REYNA.

Since the drafting-room will accommodate but thirty students in each section, those registering in the course will be assigned to desks in the order of registration in the Department. Therefore, in order to secure a place it will be necessary to report promptly to the Department. A small amount of outside reading may be required.

2. **Free-hand Drawing.** First and second terms, credit two or more hours a term. Students may not enter the second term unless they have taken the course in the first term, or its equivalent. Students must register for not less than two hours in either term. Lectures during practice. Practice by appointment, T W Th F, 8–1, 2–4.30. Dairy Building 371. Assistant Professor BAKER and Miss GARRETT.

An elementary course for the development of graphic expression applicable to scientific studies. Of special value to those who expect to enter the field of teaching, nature study, or biological research. The course aims also to develop the student's appreciation of pictures. As this course is laid out for the entire year, students are advised against planning to take only the work of the first term. Since there are no lectures nor required reading in this course, one hour credit in free-hand drawing means three hours of actual practice.

3. **Free-hand Drawing, Advanced Course.** First or second term, credit two or more hours. Prerequisite course 2 or its equivalent. Students must register

for not less than two hours. Lectures during practice. Practice by appointment, T W Th F, 8–1, 2–4.30. Dairy Building 371. Assistant Professor BAKER and Miss GARRETT.

Personal instruction in pencil, pen-and-ink, charcoal, wash, and water-color drawing.

4. **Perspective.** Second term, credit two hours. Prerequisite course 2 or its equivalent, and descriptive geometry. For students in landscape art. Lectures, hours to be arranged. Practice, S, 8–1. Dairy Building 341. Mr. REYNA.

A course in appearance representation from plan and elevation.

ENTOMOLOGY, LIMNOLOGY, AND NATURE STUDY

Biology

1. **General Biology.** First and second terms, credit three hours a term. Lectures, M W, 9, or T Th, 9. Roberts Hall 131. One practice period a week, T, Th, F, or S, 8–10.30, daily, 10.30–1, or daily except S, 2–4.30. Roberts Hall 302. Professors NEEDHAM and JOHANNSEN, and assistants.

This is an elementary course designed to acquaint the general student with the main ideas of biology through selected practical studies of the phenomena on which biological principles are based. Both lectures and laboratory work will deal with such topics as the interdependence of organisms, the simpler organisms, organization and phylogeny, heredity and variation, natural selection and adaptation, segregation and mutation, the life cycle, metamorphosis and regeneration, and the responsive life of organisms. Laboratory fee, $2.50 a term.

Introductory Entomology

1. See Biology, course 1.

2. **The Ecology of Insects.** Third term, credit three hours. One lecture and two practical exercises, largely field work. Lectures, W, 8. Roberts Hall 392. Practical exercises by appointment. Professor NEEDHAM.

A general course in the study of the lives of insects in relation to their environment. Practical studies will be made of the activities of insects and of the rôle that they play in different natural associations. Observations will be made on the relations between their structures and instincts and the situations in which they live, and on many of the ways in which they find a living and establish homes.

3. **General Entomology.** First and second terms, repeated third term, credit three hours a term. Prerequisite course 1 or Zoology 1. First and second terms: Lectures, W F, 9. First term, Dairy Building 222; second term, Roberts Hall 392. Professor HERRICK. Practical exercises, W, Th, or F, 2–4.30, or S, 8–10.30. Roberts Hall 392. Professor HERRICK, Miss STRYKE, and Mr. HAWLEY. Third term: Lectures, daily except S, 8, July 7 to August 15. Roberts Hall 392. Miss STRYKE. Practical exercises, two afternoons by appointment, July 7 to August 15. Miss STRYKE and Mr. ———.

First term, lectures on the characteristics of orders, suborders, and the more important families, and on the habits of representative species. The practical exercises include a study of the structure of insects and practice in their classification. The lectures only (credit two hours) are taken by those who have had courses 4 and 5. The work of the first term may be taken without registration for the second term. It is repeated in the third term. Laboratory fee, $3.

Second term, lectures on the more important insect pests and on methods of controlling them. The practical exercises will include a study of the different stages of as many of the forms as time will permit, together with observations in the field on the habits of the pests. Prerequisite first term of this course. Laboratory fee, $3.

Third term, the work will cover essentially the same ground as that of the first term. When possible, the laboratory work will utilize materials collected by the student in the field. Laboratory fee, $1.50.

4. **Elementary Morphology of Insects.** First, second, or third term, credit three hours. Laboratory open daily except S, 8–5. Roberts Hall 391. First and second terms, Professor W. A. RILEY and Mr. LEIBY; third term, Miss STRYKE and Mr. ———.

An introductory laboratory course required of all students who plan to do advanced work in entomology. Laboratory fee, $2.

5. **Elementary Systematic Entomology.** First, second, or third term, credit two hours. Must be preceded or accompanied by course 4; may advantageously be preceded or accompanied by course 10. Laboratory and field work, Monday and Wednesday afternoons, or other hours by special arrangement. Roberts Hall 301. First and second terms, Assistant Professor BRADLEY and Mr. WENDELKEN; third term, Miss STRYKE and Mr. ———.

Practice in the identification of insects, and in the method of phylogenetic study as illustrated by their wing venation. With course 4, required of all students who plan to do advanced work in entomology. Laboratory fee, $3.

8. **Elementary Economic Entomology.** First term, two hours, without credit toward graduation. A course designed for special students; not open to regular students. Lectures, T Th, 9. Roberts Hall 392. Assistant Professor MATHESON.

Discussion of insect pests in general, with remedial suggestions. Occasionally the class will be taken to the field in order to observe insect pests at work. Laboratory fee, 50 cents.

Systematic Entomology

10. **Entomotaxy.** Second term, credit two hours. Should preferably precede or accompany course 5; required of all students taking advanced work in systematic entomology. Laboratory and field work, T or F, 2–5, and S, 9–12. Roberts Hall 301. Assistant Professor BRADLEY.

Methods of collecting insects and preserving them for study and for the cabinet, and other matters of technique; the principles of insect photography. Laboratory fee, $3.

11. **Advanced Systematic Entomology.** First or second term, credit three or more hours. Prerequisite courses 4, 5, and 10. Laboratory work by appointment. Roberts Hall 301. Assistant Professor BRADLEY and Mr. WENDELKEN.

A training course in the identification and interpretation of obscure characteristics used in the classification of insects. Laboratory fee, $2 an hour.

12. **Taxonomy of Insects.** Throughout the year, credit four hours a term. Prerequisite courses 3, 4, 5, 10, 11, and 20, or the equivalent. Lectures, F, 8. Laboratory, hours to be arranged. Roberts Hall 392. Professors NEEDHAM, W. A. RILEY, and JOHANNSEN, Assistant Professors BRADLEY and MATHESON, Miss STRYKE, Mr. LLOYD, and cooperating specialists. Students should register for this course with Assistant Professor Bradley.

This course will continue through a number of terms, but the work of each term may be elected independently. It is intended primarily for graduate students who desire a systematic survey of one or more of the orders of insects and a practical working knowledge of them. Selected representative species will be studied in the laboratory, and the student will have opportunity to become acquainted with the particular methods of study applicable to the groups concerned, and with the technique and literature of each. The lectures will deal with the general aspects of the taxonomy of each group, its origin and distribution, its more generalized forms, and its chief lines of specialization, and data will be drawn freely from the fauna of the world at large, from developmental stages, and from the known fossil forms.

A. Physopoda, Mallophaga, Heteroptera. First term. Professor JOHANNSEN and Assistant Professor BRADLEY.

B. Homoptera. Second term. Professor JOHANNSEN and Assistant Professor BRADLEY. Special attention will be given to scale insects and plant lice.

C. Myriapoda and Arachnida. Third term. Miss STRYKE.

[D. Lepidoptera. First term, 1915–16. Miss STRYKE.] Not given in 1914–15.

[E. Diptera and Siphonaptera. Second term, 1915–16. Assistant Professor JOHANNSEN.] Not given in 1914–15.

[F. Neuropteroids. Third term, 1916. Professor NEEDHAM and Mr. LLOYD. Not given in 1914–15.

[G. Coleoptera. Professor JOHANNSEN and Assistant Professors BRADLEY and MATHESON.] Not given in 1914–15.

[H. Orthoptera, Euplexoptera, and Thysanura.] Not given in 1914–15.

[I. Hymenoptera. Assistant Professor BRADLEY.] Not given in 1914–15.

[13. **Classification of the Coccidae (Scale Insects).** Second term, credit two hours. Prerequisite courses 4, 5, 10, and 11. Laboratory work by appointment. Roberts Hall 301. Assistant Professor BRADLEY.] Replaced in 1914–15 by course 12, B. Laboratory fee, $3.

14. **Literature of Systematic Entomology.** First term, credit three hours. Prerequisite course 3 or 5, or Zoology 5. Lectures, M, 8. Laboratory and library work by appointment. Roberts Hall 392. Assistant Professor BRADLEY.

A study of general entomological literature. Practice in the use of generic and specific indices and of bibliographies, and in the preparation of the latter. The methods of preparing technical papers for publication, including the preparation of illustrations. The rules of nomenclature, including the derivation and formation of scientific names. Laboratory fee, $1.

19. **Research in Systematic Entomology.** Throughout the year, credit three or more hours a term. Prerequisite courses 3, 4, 5, 10, 11, 14, and 20. Laboratory open daily except S, 8–5, S, 8–1. Roberts Hall 301. Assistant Professor BRADLEY, and Professors NEEDHAM and JOHANNSEN.

Special work arranged with reference to the needs and attainments of each student. Laboratory fee, 50 cents an hour.

Insect Morphology

20. **Morphology and Development of Insects.** First term, credit two hours. Prerequisite courses 3 (first term), 4, and 5. Lectures, T Th, 10. Laboratory work to accompany or follow this course is offered under course 21. Roberts Hall 392. Professor W. A. RILEY.

21. **Histology of Insects.** First term, credit three or more hours. Prerequisite courses 3 (first term), 4, 5, and 20. Laboratory open daily except S, 8–5. Roberts Hall 391. Professor W. A. RILEY.

A laboratory course to accompany or follow the first term of course 20. Laboratory fee, $1.50 an hour.

27. **German Entomological Reading.** First term, credit one hour. Open only to advanced students in entomology or zoology. W, 7–9 p. m. Roberts Hall 392. Professor W. A. RILEY.

Textbook used, Schröder's Handbuch der Entomologie.

28. **French Entomological Reading.** First term, credit one hour. Open only to advanced students in entomology or zoology. T, 7–9 p. m. Roberts Hall 392. Miss STRYKE.

The work in this course will be based on Henneguy's Les Insectes.

29. **Research in Morphology of Insects.** Throughout the year, credit three or more hours a term. Prerequisite courses 3, 4, and 5. Laboratory open daily except S, 8–5, S, 8–1. Roberts Hall 391. Professors W. A. RILEY and NEEDHAM.

Special work arranged with reference to the needs and attainments of each student. Laboratory fee, $1.50 an hour.

Parasitology and Medical Entomology

30. **Animal Parasites and Parasitism.** First term, credit two hours. Must be preceded or accompanied by Zoology 1. Lectures, T, 8. Roberts Hall 392. Practical exercises: sec. 1, M, 2–4.30; sec. 2, T, 2–4.30. Professor W. A. RILEY and Mr. TOTHILL.

A consideration of the origin and biological significance of parasitism, and of the structure, life history, and economic relations of representative animal parasites. Laboratory fee, $2.

[31. **Relations of Insects to Disease.** Second term, credit two hours. Prerequisite first term of course 3 or 30. Lectures, T, 8. Roberts Hall 392. Practical exercises: sec. 1, M, 2–4.30; sec. 2, T, 2–4.30. Professor W. A. RILEY and Mr. TOTHILL.] Not given in 1914–15.

Causation and transmission of disease by insects and other arthropods. Laboratory fee, $2.

32. **Advanced Work in Parasitology.** First term, credit two or more hours. Prerequisite courses 30 and 31. Laboratory work and conferences, by appointment. Roberts Hall 391. Professor W. A. RILEY and Mr. TOTHILL.

Special work adapted to the needs of the individual student. Those planning to work along the lines of the relations of insects to disease, or of parasites of insects, should precede or accompany this work by course 21.

Advanced Economic Entomology

40. **Advanced Economic Entomology and Insectary Methods.** Third term, two hours. Open only to graduates. Seminary, T, 2–4.30. Field and laboratory work by appointment. Insectary. Assistant Professor MATHESON.

Economic problems connected with applied entomology will be discussed and reported on, and field observations will be made. Experimental methods in breeding, photographing, investigating, and controlling insects will be discussed and studied. Designed for advanced students in entomology who desire to fit themselves for experiment station work. Laboratory fee, $2.50.

41. **Forest Insects.** Second term, credit two hours. Prerequisite first term of course 3. Lectures, T Th, 11. Roberts Hall 392. Professor HERRICK.

A course of lectures dealing with insects injurious to forest and shade trees, together with a consideration of the best methods of controlling their ravages.

49. **Research in Economic Entomology.** Throughout the year, credit three or more hours a term. Prerequisite courses 3, 4, and 5. Laboratory and field work by appointment. Insectary. Professor HERRICK and Assistant Professor MATHESON.

In most cases it is impracticable to complete an investigation in this subject during the college year. Students must arrange to conduct their observations during the growing season.

Limnology

50. **General Limnology.** Second and third terms, credit two hours a term. Open only to students who have taken or are taking course 3 and Biology 1, or the equivalent. Lectures, Th, 8. Roberts Hall 392. Laboratory, Th, 2–4.30. Roberts Hall 492. Professor NEEDHAM and Mr. LLOYD.

An introduction to the study of the life of inland waters. Aquatic organisms in their qualitative, quantitative, seasonal, and ecological relations. Laboratory fee, $2.50.

51. **Aquiculture.** Second term, credit two hours. Lectures, M W, 12. Roberts Hall 392. Assistant Professor EMBODY.

A course on the conservation and utilization of the resources of inland waters.

52. **Fish Culture.** Second term, credit two hours. Must be preceded or accompanied by course 51. W F, 2–5. Biological Field Station and Experimental Hatching Station. Assistant Professor EMBODY.

A laboratory course designed to give acquaintance with the fresh-water food and game fishes, the natural conditions in which they live, and methods for their propagation. Laboratory fee, $2.50.

59. **Research in Limnology.** Throughout the year, credit three or more hours a term. Prerequisite course 50 or its equivalent. Laboratory and field work by appointment. Roberts Hall 492 and Biological Field Station. Professors NEEDHAM and W. A. RILEY, and Assistant Professor EMBODY.

Nature Study

61. **Nature Study Pedagogy and Literature.** Second term, credit two hours. Lectures, M W, 12. Goldwin Smith 227. Assistant Professor COMSTOCK.

Lectures on nature study as a part of primary education; discussion of methods of correlating nature study with other school work; review of popular nature literature and its effect on the child.

62. **Nature Study in Field and Laboratory.** First and second terms, credit two or more hours a term. Practice, T Th, 11–1. Roberts Hall 402. Assistant Professor COMSTOCK.

This course gives laboratory and field practice with those subjects in plant and animal life that are best fitted for nature study in the elementary schools. Special attention is given to methods of study and manner of presentation, and also to the relation of the topics to agriculture. The work consists of conferences, field practice, and laboratory practice.

63. **Nature Study.** First and second terms, credit two or more hours a term. Prerequisite course 2 and Biology 1; advanced course. Lectures, hour to be arranged. Laboratory, M, 2–4.30. Roberts Hall 402. Assistant Professor COMSTOCK.

Field and laboratory work. This course includes the study of literature pertaining to nature.

65. **Conference in Nature Study.** Second term, credit one hour. W, 11. Roberts Hall 406. Professor NEEDHAM and Assistant Professor COMSTOCK.

Informal discussions of the relations of nature study to life, to science, to agriculture, and to the public schools.

Seminaries

Seminary. Throughout the year. M, 4.30–5.30. Roberts Hall 392.

The work of an entomological seminary is conducted by the Jugatae, an entomological club which meets for the discussion of the results of investigations. Attendance at the meetings may be counted as laboratory work.

79. **Journal Club.** First and second terms, credit one hour a term. Hour to be arranged. Roberts Hall 392. Professors NEEDHAM, W. A. RILEY, and HERRICK, and Assistant Professor BRADLEY.

Reviews and discussions of current literature relating to the work of the Department. Required of graduate students.

EXTENSION TEACHING

1. **Extension Work.** First term, credit two hours. Open to juniors and seniors, and to others by arrangement. Public Speaking 1 is recommended to precede this course. Lectures and practice, M F, 11, W F, 10, or T Th, 10 or 12. Criticism by appointment, daily, 8–1. Roberts Hall 131. Professor TUCK, Assistant Professors EVERETT and WHEELER, and Messrs. WHITNEY, ROBINSON, and SHAPER.

Lectures and discussions on problems of university extension in agriculture. Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to acquaint students with parliamentary practice, to encourage interest in public

affairs, and to train for effective self-expression in public. Special training will be given to competitors for the Eastman Prize for Public Speaking (see page 23). A few juniors and seniors will be sent out into the State to address meetings.

2. **Extension Work.** Second term, credit two hours, or three hours by arrangement. Prerequisite course 1, of which course 2 is a continuation. Lectures and practice, W F, 10, Dairy Building 222; or M F, 11, or T Th, 10 or 12, Roberts Hall 131. Criticism by appointment, daily, 8–1. Professor TUCK, Assistant Professors EVERETT and WHEELER, and Messrs. WHITNEY, ROBINSON, and SHAPER.

3. **Extension Work, Advanced Course.** First term, credit one hour. Prerequisite courses 1 and 2 or the equivalent. F, 8. Roberts Hall 232. Professor TUCK, Assistant Professors EVERETT and WHEELER, and Mr. WHITNEY.

The course will take up advanced study of extension problems and parliamentary law. Students will be given opportunity to gain experience in addressing meetings whenever it can be arranged. The number of students will be limited.

THE FARM

1. **The Farm.** First, second, or third term, credit two hours. Field work and recitations, by appointment. One practice period a week, daily, 8–10.30 or 10.30–1, or daily except S, 2–4.30, at appointed places on the farm. Professor NEEDHAM, Assistant Professors COMSTOCK and EMBODY, Mr. ALEXANDER, and assistants.

This is a course in the study of our agricultural environment. The university farm will be explored. Its topography, its population, and its chief crops, wild and cultivated, will be studied. Its fields, hills, woods, and streams will be explored, and records will be made of the things observed.

The course deals with the sources of agriculture. It considers crops from the naturalist's viewpoint—Nature's cereals and fruits and roots and fowls that were all present before agriculture developed. Wild products will be compared with cultivated varieties, and the related forms that have not been brought into cultivation will not be overlooked. Finally, these things will be viewed collectively, as conditioning the human affairs of the country community. They will be considered as elements that may be contributory to the beauty, the healthfulness, and the intellectual interest and enjoyment of the farm home. Fee, $2.

FARM CROPS

1. **Cereals, Forage Crops, and Miscellaneous Crops.** First or second term, credit four hours. To be preceded or accompanied by Soils 1 or 2. Lectures, M W F, 10. Roberts Hall 292. Laboratory: first term, M, T, W, or F, 2–4.30; second term, M or T, 2–4.30. Agronomy Building 202. First term, Professor MONTGOMERY and Mr. HARDENBURG; second term, Mr. DYNES.

The history, culture, uses, and distribution of the principal farm crops. Laboratory study of the principal types and varieties. Laboratory fee, $2.

2. **Cereal Crops.** First or third term, credit two hours. Prerequisite course 1. Lectures, T Th, 8. Roberts Hall 292. Professor MONTGOMERY and Mr. DYNES.

An advanced course dealing with the principal cereal crops, based largely on a study of literature and experimental data.

3. **Forage Crops.** Second or third term, credit two hours. To be preceded by course 1. Lectures: second term, T Th, 8; third term, T Th, 10. Roberts Hall 292. Professor MONTGOMERY and Mr. DYNES.

An advanced course. Lectures and recitations on the characters, use, and production of the principal forage plants, and the management of meadows and pastures, based on study of literature and experimental data.

4. **Potatoes and Special Crops.** First or second term, credit two hours. To be preceded or accompanied by course 1. Lectures, T, 11. Agronomy Building 192. First term: first half, laboratory, Th, 2–4.30; second half, recitations, Th, 11. Second term: first half, laboratory, Th or F, 2–4.30; second half, recitations, Th, 11 or 12. Agronomy Building 192. Mr. HARDENBURG.

Lectures, laboratories, and recitations considering the history, importance, nature, classification, culture, marketing, and uses of the crops under discussion. Laboratory fee, $2.

5. **Seminary.** First and second terms, without credit toward graduation. Required of graduate students. Th, 9. Agronomy Building 192. Professor MONTGOMERY.

6. **Research.** Throughout the year, two or more hours a term. Prerequisite permission to register. The student will usually be required to remain during one third term, in order to work out experimental problems. Limited to graduate students. Professsor MONTGOMERY.

FARM MANAGEMENT

1. **Farm Accounting.** First or second term, credit two hours. Should precede course 2. Lectures, T, 8. Poultry Building 375. Laboratory, T or Th, 2–4.30, or S, 8–10.30. Poultry Building 325. Each student must report to the Department for laboratory assignment. First term, Assistant Professor THOMPSON and Mr. ———; second term, Messrs. LADD and ———.

Farm inventories, single-enterprise accounts, complete farm accounts, and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm. Laboratory fee, $1.

2. **Farm Management.** First, second, or third term, credit four hours. Open only to seniors, juniors, and second-year specials who have had or are taking Animal Husbandry 1 and Farm Crops 1 or the equivalent, and who have passed the farm-practice examination. No student unable to satisfy the above requirements will be admitted to the course except by special permission from the professor in charge. Certain combinations of other subjects may be accepted by the Department in substitution for Animal Husbandry 1 and Farm Crops 1. This course is designed for students who have had considerable farm experience. It should be taken near the end of the student's college course, and should be preceded or accompanied by as many as possible of the following subjects: Farm Management 1, Pomology 1 and 2, Poultry Husbandry 1 or 10, Vegetable Gardening 1 or 2, Farm Crops 4, Animal Husbandry 10. Lectures, M W F, 10. Poultry Building 375. One laboratory period a week, daily except S, 2–4.30, or S, 8–10.30. Poultry Building 225. On days when farms are visited, laboratory work may last longer than two and one-half hours. First term, Professor WARREN and Mr. LADD; second term, Professor LIVERMORE and Mr. LADD; third term, Assistant Professor THOMPSON and Mr. ———.

Lectures, recitations, and laboratory practice. Farming as a business; labor income; size, diversity, and production of business; regions and types of farming; cropping systems; farm layout; building arrangement; efficient use of labor, horses, and machinery; marketing; forms of tenure and leases; organization and management of successful farms; ways of starting farming; use of capital and credit; choosing and buying a farm; planning, organization, and management of specific farms. One-day excursions will be made about October 15, May 15, and September 5, to farms at some distance from Ithaca. Laboratory fee, $1.

3. **Farm Management, Advanced Course.** First term, credit two hours. Prerequisite permission to register, and courses 1 and 2. Application for admission to the course should be made several days before registration. M, W, or F, 2–5. Poultry Building 325. On days when field trips are taken, the class will in some cases leave on a noon train and return on an evening train. Assistant Professor THOMPSON and Mr. ———.

Field trips for studying farms and regions. Discussions of organization and management of farms visited. Some time will be devoted to other problems in farm management. There will be two one-day field trips or one two-days field trip for each section in October or November. Expenses for trips are estimated to be about $10.

4. **Seminary.** First and second terms, credit one hour a term. Open to graduate students. T, 7.15–8.30 p. m. Poultry Building 225. First term, Professor WARREN; second term, Professor LIVERMORE.

Seminary, problems, reading, discussions, and talks by outside speakers on subjects relating to farm management.

5. **Research.** First, second, or third term, credit one or more hours. Prerequisite permission to register, and courses 1, 2, 3, and 4. Only those students who can present an acceptable plan for an investigation will be admitted. Hours by appointment. First term, Professor WARREN; second term, Professor LIVERMORE; third term, Assistant Professor THOMPSON.

Special investigations of farm-management problems.

FARM PRACTICE

1. **Farm Practice.** First, second, or third term, without credit toward graduation. Hour and place by appointment. Professor STONE and Mr. MOULTON.

An elective course designed to assist students in meeting the requirements in farm practice demanded by the College. In order to meet these requirements, students must have a practical knowledge of horses, cattle, sheep, swine, poultry, crops, farm machinery, orcharding, gardening, butter and cheese making, and the like. All men students except those whose record and registration at the beginning of the senior year show that they are specializing to the extent of fifteen hours in home economics, forestry, landscape art, or entomology, must fully satisfy, before the beginning of the senior year, the requirements in farm practice. All men students are required to report to the Department of Farm Practice as assigned within the first three weeks of their first term in the College.

FLORICULTURE

Instruction in floriculture is designed to meet the requirements of several classes of students: (1) those who intend to make some branch of commercial flower-growing their life work; (2) those who plan to take up retail work; (3) those who are interested in amateur flower-growing for pleasure and for home decoration; (4) those who plan to take up some line of work on private estates or in city parks. With this object in mind, courses have been outlined which give students a thorough knowledge and training in some one or in several of these features. While course 1 is open to freshmen, it is advised that students who have had no training in botany delay taking this course until their second year. Courses 3 and 4 should not be elected until courses in soils, plant physiology, plant pathology, plant breeding, and economic entomology have been taken. A broad foundation is thus laid on which to build the scientific and technical principles of flower growing.

1. **Principles and Methods of Greenhouse Practice.** First term, credit three hours. Lectures, T Th, 11. Roberts Hall 232. Practice, W, 2–4.30. Greenhouses. Professor WHITE and Assistant Professor LUMSDEN.

A course intended to acquaint students with general greenhouse methods and the scientific principles that govern the same. This is an elementary course in flower growing.

2. **Greenhouse Construction.** First term, credit three hours. Lectures, M, 11. Roberts Hall 232. Practice, T Th, 2–4.30. Roberts Hall 292. Assistant Professor LUMSDEN and Mr. PATCH.

The evolution of the greenhouse, present-day types, materials and methods of construction, principles and methods of heating. Laboratory practice consists of making detail drawings and blue prints of greenhouse material, drawing plans for commercial and private ranges, and preparing specifications of the same, with estimates of cost of construction. Practical exercises in concrete bench construction, glazing, and other construction problems will be given as facilities allow. The class will participate in a required excursion to Rochester on December 12. Laboratory fee, $1.

3. **Commercial Floriculture.** Second or third term, credit four hours. Prerequisite course 1 or commercial experience, and course 2. Lectures and recitations, M W F, 10. Roberts Hall 232. Practice, W, 2–4.30. Greenhouses. Professor WHITE and Assistant Professor LUMSDEN.

Studies in the propagation and culture of florists' crops. As far as possible, practical work will be given in the propagation and culture of roses, carnations, violets, orchids, and other plants grown for commercial purposes. Methods of packing, shipping, and marketing will be considered. Laboratory fee, $2.

4. **Commercial Floriculture.** First term, credit four hours. Prerequisite course 3. Lectures and recitations, M W F, 10. Roberts Hall 232. Practice, F, 2–4.30. Greenhouses. Professor WHITE and Assistant Professor LUMSDEN.

A continuation of course 3, with methods of propagation and culture of those commercial crops not previously considered. These courses, with their prerequisites, aim to fit persons for commercial work. Students taking these courses are advised to work during vacations on commercial ranges. The class will participate in a required excursion to Rochester on December 12. Laboratory fee, $2.

5. **Greenhouse and Garden Practice.** Throughout the year, credit one or two hours. Prerequisite course 1, and permission to register. Practice by appointment. Greenhouses and gardens. Professor WHITE and members of the staff.

Designed to give students a wider experience in the practice of flower growing. The course consists of practical work in all branches of greenhouse management. Reports of work done are required.

6. **Floral Arrangement.** Second term, credit one hour. Lectures, demonstrations, and practice, S, 8–10.30. Greenhouses. Professor WHITE, Mr. PATCH, and Miss MINNS.

A study of the principles and methods of arrangement of flowers for home decoration and table decoration, in baskets, vases, and formal designs; also the arrangement of flowers and plants for all types of interior decoration. Laboratory fee, $3.50.

7. **Conservatory Plants.** Second or third term, credit two hours. Prerequisite course 1. Lectures and demonstrations, T Th, 11. Roberts Hall 232 and greenhouses. Professor WHITE and Mr. PATCH.

Designed for students interested in work on private estates or in parks. This course should be preceded or accompanied by courses 2 and 3. A study of tropical and subtropical foliage and flowering plants that are used for the ornamentation of glasshouses of decorative type. Laboratory fee, $2.

8. **Garden Flowers.** Second and third terms, credit three hours. Lectures, T Th, 10. Roberts Hall 232. Practice, T or Th, 2–4.30. Greenhouses and gardens. Assistant Professor LUMSDEN and Miss MINNS.

A study is made of the identification, propagation, and culture of annuals, herbaceous perennials, and roses. It is aimed to give the student an intimate knowledge of those forms of annual and herbaceous plants that may be used in garden planting either on home grounds or in public parks. An excellent collection of plant material is available for demonstration work in this course. All members of this class will be required to participate in an excursion to the Thompson estate at Canandaigua on May 15 and August 14. Laboratory fee, $2.

9. **Amateur Floriculture.** First and second terms, repeated third term, credit two hours each term. Lectures, F, 11. Roberts Hall 232. Practice, S, 10.30–1. Greenhouses. Miss MINNS.

The propagation and culture of potted plants in the home—plants suitable for window gardening and for outdoor home-gardening. The course includes a study of containers, soils, fertilizers, and insecticides; also the preparation and planting of flower beds. It is planned primarily for students who are interested especially in home economics, but is open to any one desiring information regarding simple methods of plant culture. Laboratory fee, $2 a term.

10. **Wholesaling and Retailing Flowers.** Second term, credit one hour. Prerequisite courses 3 and 4, and permission to register. Lectures, F, 9. Roberts Hall 232. Professor WHITE.

This course is planned with the view of giving students a thorough knowledge of methods of retail store management, store equipment, salesmanship, business methods, delivery, decorating for all functions, methods of conducting cooperative flower exchanges and wholesale markets. Other topics of a like nature will be discussed.

11. **The History and Literature of Floriculture.** Second term, credit two hours. Lectures, M W, 11. Roberts Hall 232. Designed primarily for seniors and graduate students. Professor BEAL.

A comprehensive study of the evolution of gardening, the introduction of plant material, and the development of floricultural ideals. These are traced, beginning with the earliest records, through the centuries to the present time. The unusually large library collection of herbals and European works of later date offer exceptional facilities for presenting this course.

12. **Investigation in Floriculture.** Throughout the year, credit one, two, or three hours a term. Prerequisite courses 1, 3, and 4, and permission to register. Designed primarily for upperclassmen and graduate students. Consultation by appointment. Professors WHITE and BEAL.

The investigation of problems in growing flowers for cutting, exotics, garden flowers, and the like.

13. **Seminary.** Throughout the year, one hour a term. Required of advanced students who elect course 12, and of all graduate students. Th, 4.35–5.45. Roberts Hall 232. Professor WHITE and members of the staff.

FORESTRY

The instruction in forestry is designed to meet the needs of several classes of students: (1) students of general agriculture who wish elementary instruction in the care of woodlands and in forest planting and forest nursery work; (2) prospective teachers, business men, lawyers, and others who desire an understanding of the place of forestry in the life of a nation; (3) technical students in other lines who wish one or more technical forestry courses, such as wood technology; (4) professional forestry students, preparing for forestry as a life work or pursuing a professional forestry course as a means of general education, useful in business life or otherwise. The course is designed, not only to prepare professional students for a career in general forestry, but also to provide opportunity for advanced study and research in silviculture, forest management, forest mensuration, forest entomology, forest pathology, and other lines in which specialists will be useful.

The professional course requires five years, leading to the degree of Bachelor of Science at the end of the fourth year and to that of Master in Forestry at the end of the fifth year. The entrance requirements are the same as for general agriculture.

During the first four years the student is registered in the College of Agriculture and his work must include: (a) all the courses required of general agricultural students; (b) solid geometry and plane trigonometry; (c) such other courses as the Department of Forestry believes to be best adapted to meet the needs of the

individual student. On page 50 is given a recommended sequence of studies that will prove desirable for most students specializing in this field. It is to be understood, however, that this is not a curriculum required of all students. At the discretion of the Department deviations from it will be made for students entering the course with advanced standing, and for other students when advisable. In all cases the course of study for a professional forestry student must be planned by the Department of Forestry; and the faculty has ruled that each professional forestry student must choose as his faculty adviser one of the professors or assistant professors in the Department of Forestry. Admission to candidacy for the degree of Master in Forestry may be conditioned on compliance with this regulation. Before becoming a candidate for the master's degree, the student must have had at least three months experience in forestry work or in a logging camp, satisfactory proof of which is to be by a signed statement or by an examination in woodmanship, or by both. Students specializing in forestry are not required to pass the examination in farm practice.

In the fifth year the student registers in the Graduate School for one major and one minor subject, and pursues either advanced study or research along these lines. This year is not devoted to undergraduate class work taken by graduate students, although in special cases a part of the student's time may be spent in such work.

Further details regarding the professional course are given in the special announcement of the Department of Forestry. This announcement, which can be obtained from the Department of Forestry or from the Secretary of the College of Agriculture, should be procured by all students who plan to specialize in forestry.

Courses intended primarily for students who do not expect to make forestry their major work

1. **The Farm Woodlot.** First term, credit two hours. Lectures, M, 9. Forestry Building 122. Practice, M or T, 2–4.30. Forestry Building 118. Professor MOODY.

The management of the farm woodlot, and the starting of new woodlots by planting or sowing. A course dealing with the woodlot as deserving and repaying proper care, such as is given other crops on the farm. Laboratory fee, 50 cents.

Students expecting to take courses 2 and 3 should not elect course 1, as the ground covered in course 1 is repeated in courses 2 and 3.

2. **Elements of Forestry: Mensuration, Utilization, and Management.** First term, credit three hours. Lectures, T Th, 9. Forestry Building 122. Practice, W or Th, 2–4.30. Forestry Building 118. Assistant Professor BENTLEY.

An elementary course including estimating and measuring the amount of standing timber and its value; measurement of logs and other forest products; rate of growth of timber in diameter, height, volume, and value; the best uses to which various forest products can be put; methods of logging, milling, and sale of timber; identification of common woods; age at which timber should be harvested; methods of regulating the amount of timber cut so as to insure a permanent income. (See course 3.) Laboratory fee, $1.

3. **Elements of Forestry: Silviculture.** Second term, credit three hours. Lectures, T Th, 9. Forestry Building 122. Practice, T or W, 2–4.30. Forestry Building 118. Professor SPRING.

An elementary course including the life history of the forest; the influence of soil and climate on forests; the influence of forests on stream flow, climate, and soil; forest planting, sowing, and nursery work; reproducing the forest without planting or sowing; care of the crop during its growth, including thinning; protection from fire and other enemies; identification of a few of the principal timber trees of this region. Laboratory fee, $1.

Courses 2 and 3 may be taken independently. If both courses are taken, they should meet the needs of students who wish a more detailed knowledge of timberland management than is given in course 1, but do not wish the professional courses.

Courses intended for both professional forestry students and students in other lines

6. **The Field of Forestry.** First term, credit two hours. Lectures, W F, 9. Forestry Building 122. Professor SPRING.

The place of forestry in the life of a nation; its aims and importance; national, state, communal, and private forestry enterprises; the day's work of a forester.

8. **Wood Technology.** Second term, credit two hours. (The entire course will be completed in the first ten weeks of the term, during which time there will be two lectures and one practice period each week.) Lectures, M W, 10. Forestry Building 122. Practice: professional forestry students, T, 2–4.30; other students, M, 2–4.30. Forestry Building 8. Professor RECKNAGEL.

Structure of wood; physical, chemical, and mechanical properties of wood; technical uses of wood (paper pulp, destructive distillates, and the like); wood conditioning (drying and seasoning); wood preservation. Laboratory fee, $1.

Courses intended primarily for professional forestry students

Professional forestry students should not elect courses 1, 2, and 3, as the following required professional courses cover the same ground in greater detail.

9. **Forest Utilization.** First term, credit four hours. Lectures, M T W Th, 10. Forestry Building 122. Field trip, one week (spring vacation), study of a lumbering operation in the Adirondacks or in northern Pennsylvania; cost not to exceed $15. (The field trip is required of professional students, optional with others; credit for the course is given at the close of the first term.) Professor RECKNAGEL.

The principal industrial uses of timber; logging methods and equipment; logging in representative regions; manufacture of lumber; determination of stumpage values; timber sale contracts; timber sale administration, including marking, brush disposal, and scaling in practice; minor industries; utilization of forest products other than wood, as grazing range, fish and game, and the like.

10. **Forest Engineering.** Second term, credit two hours. Prerequisite plane trigonometry and one course in surveying. Lectures, T Th, 11. Forestry Building 122. Assistant Professor BENTLEY.

The construction of trails, roads, telephone lines, and the like. Field work in forest engineering is given in the field trip included in course 23.

11. **Forest Mensuration.** Second term, credit five hours. Lectures, M W, 8. Forestry Building 122. Practice, F, 8–1 and 2–4.30. Forestry Building 118. Assistant Professor BENTLEY.

Measurement of logs and standing timber; timber cruising; study of the rate of growth of timber; volume and yield tables. Laboratory fee, $1.50.

13. **Timber Trees and Forest Regions.** First term, credit three hours. Lectures, M W, 12. Forestry Building 122. Practice, F, 2–4.30. Forestry Building 118. Assistant Professor BENTLEY.

A brief account of the forest regions of the world; detailed description of the forest regions of the United States and Canada; the distribution, importance, and silvical characteristics of a large number of the leading timber trees of the United States and Canada, and the identification of such of these as do not grow near Ithaca. (The identification of trees growing near Ithaca is included in Botany 2.) Laboratory fee, $1.

14. **Silviculture: Forest Ecology.** First term, credit three hours. Prerequisite Botany 1 or its equivalent. Lectures, W F, 8. Forestry Building 122. Practice, W, 2–4.30. Forestry Building 8. Professor HOSMER.

The influence of site on the forest and of the forest on site; the behavior of trees as members of a forest community. Laboratory fee, 50 cents.

15. **Silviculture: Natural Reproduction and Care of the Forest.** Second term, credit three hours. Prerequisite courses 13 and 14. Lectures, T Th, 8. Forestry Building 122. Practice, Th, 2–4.30. Forestry Building 118. Professor HOSMER.

A technical discussion of the silvicultural systems as practiced in Europe, and the possibility of using them in each of the forest regions of the United States and Canada; improvement cuttings, thinning, and underplanting; marking timber for cutting. Laboratory fee, 50 cents.

16. **Silviculture: Forest Planting and the Forest Nursery.** Second term, credit three hours. Lectures, W, 9. Forestry Building 122. Practice, S, 8–1. Forestry Building 118. Professor SPRING.

Collection, care, and testing of tree seeds; identification of tree seeds and seedlings; raising trees in a forest nursery; starting forests by planting trees and by direct seeding; fixation of sand dunes; forestation on the prairies and under semi-arid conditions; great forestation enterprises of the world. Laboratory fee, $1.50.

18. **Forest Protection.** First term, credit one hour. Open only to professional forestry students. Lectures, Th, 11. Forestry Building 122. Professor SPRING.

Protection of forests from fire and other enemies. Protection from injury by insects and fungi is given in Entomology 41 and Plant Pathology 1 and 7, respectively.

19. **Forest Policy, Forest Law, and History of Forestry.** First term, credit three hours. Lectures, M T W, 11. Forestry Building 122. Professor SPRING.

The historical development and present status of the relations of state and individual to forestry; the elements of forest law.

20. **Forest Management.** First term, five hours. Open only to graduate students. Lectures, M T W Th, 9. Forestry Building 126. Practice, S, 9–11.30. Forestry Building 8. Professor RECKNAGEL.

Forest organization, including foundations of working plans, regulation of yields, and the formulating of working plans; forest finance, including forest valuation (the ascertainment of values) and forest statics (the comparison of values). Field work in forest management is given in the field trip included in course 23.

21. **Forest Administration.** Second term, credit two hours. (The entire course will be completed in the first ten weeks of the term, during which time there will be two lectures and one practice period each week.) Prerequisite course 20. Lectures, W Th, 9. Forestry Building 126. Practice, S, 9–11.30. Forestry Building 8. Professor RECKNAGEL.

Personnel and organization, exemplified by various actual organizations; business practice. Field work in forest administration is given in the field trip included in course 23.

22. **Seminary.** First and second terms, two hours a term. Open only to graduate students. Hours to be arranged. Forestry Building 126. Professors HOSMER, SPRING, RECKNAGEL, and MOODY, and Assistant Professor BENTLEY.

23. **Advanced Work.** First and second terms, credit two or more hours a term. Open to undergraduate and graduate students who have had the necessary training. Hours by appointment. Professors HOSMER, SPRING, RECKNAGEL, and MOODY, and Assistant Professor BENTLEY.

Individual advanced study of designated topics. During the six or eight weeks preceding Commencement, all graduate students taking course 23, except those who are specializing in lines not requiring a field trip, will be engaged in working-plan and other forestry work on a large forest tract in New York or Pennsylvania. The field trip will be in charge of Professor RECKNAGEL.

24. **Research.** First and second terms, three or more hours a term. Open only to graduate students who have had the necessary training. Hours by appointment. Professors HOSMER, SPRING, RECKNAGEL, and MOODY, and Assistant Professor BENTLEY.

Recommended sequence of studies for professional forestry students

The subjects in black-faced type are required of all students in the College of Agriculture. The subjects given in the freshman year which are not in black-faced type must be taken by all freshmen who plan to take the professional forestry course; the failure of a student to do this will complicate the remainder of his course.

Freshman year

Hours 1st term		Hours 2d term	
English 1	4	**English 1**	4
Chemistry 1	6	**Chemistry 85**	4
Biology 1	3	**Biology 1**	3
The Farm 1	2	Drawing 1	3
Mathematics 1*	3	Mathematics 3*	2

Sophomore year

Botany 1	5	**Physics 2**	5
Geology 1	3	**Botany 20 (General Plant Physiology)**	4
Geology 11	3	Geology 15	1
Civil Engineering 10 (Elementary Surveying)	3	Civil Engineering 11a (Advanced Surveying)	4
Entomology 3	3	Entomology 41	2
		Sibley S4 (Forge Work)	1

Summer following Sophomore year

Summer camp for six weeks, beginning in June. Civil Engineering 13 (Surveying), six hours credit.

Junior year

Hours 1st term		Hours 2d term	
Political Science 51	3	**Political Science 51**	3
Forestry 6	2	Forestry 8	2
Zoology 5	3	Plant Pathology 7	2
Plant Pathology 1	3	Zoology 5	3
Botany 2	3	Entomology 51	2
Civil Engineering 14 (Surveying)	2	Soil Technology 1	3

Senior year

Forestry 9	4	Forestry 10	2
Forestry 13	3	Forestry 11	5
Forestry 14	3	Forestry 15	3
Forestry 18	1	Forestry 16	3
Forestry 19	3	Landscape Art 2	1
		Rural Engineering 3	3

*If Mathematics 1 (solid geometry) has been offered for entrance, Mathematics 3 (plane trigonometry) should be taken in the first term, and Meteorology 1 should then be taken in the second term. If not taken in the freshman year, meteorology should be taken later if possible.

The remaining work of the undergraduate years should be chosen with reference to the tastes and needs of the individual student.

Fifth year

Forest management (Forestry 20); forest administration (Forestry 21); seminary (Forestry 22); and either advanced work (Forestry 23) or research (Forestry 24). During the six or eight weeks preceding Commencement, students taking course 23, except those who are specializing in lines not requiring a field trip, will be engaged in working-plan and other forestry work on a large forest tract in New York or Pennsylvania.

HOME ECONOMICS

A four-years course in home economics has been organized for students who desire to specialize in that work. The schedule of work for the first two years follows closely the outline given on page 27. The following changes, however, are made for students in home economics: they are not required to take geology; food chemistry is substituted for agricultural chemistry and must be preceded by organic chemistry; human physiology is required in place of plant physiology or physiology of domestic animals. The last two years permit specialization in some one or more of the branches included under the term "home economics." All students who register in this Department must report to the Department at the beginning of the freshman year.

1. **Foods and Nutrition, Survey Course.** Second term, credit five hours. May be taken in any year. Only a limited number of students may be admitted to this course in 1914-15. Lectures, M W F, 9. Practice, hours to be arranged. Home Economics Building 245. Miss BROWNING and assistants.

A course intended for students registered in any department in the University who desire a general knowledge of foods and nutrition. The lectures will include a discussion of foods, food preparation, and various phases of human nutrition. Laboratory fee, $7.50.

2. **House Practice.** First and second terms, credit two hours a term. Open only to freshmen in home economics, and required of them. Lectures: first term, T, 9, Home Economics Building 100; second term, M, 11, Home Economics Building 245. Practice, hours by arrangement. Misses KNOWLTON, TITSWORTH, and BLAKEY.

This course includes a discussion of the nature and reaction of cleansing agents; a study of fuels; practice in the cleaning of walls, woodwork, floors, plumbing, furnishings, utensils, and textiles, and in methods of keeping food clean. The work of the second term will consist of lectures and practice in elementary food preparation and in sewing. Laboratory fee: first term, $1; second term, $2.

3. **Foods.** First and second terms, credit four hours a term. Prerequisite Biology 1, Chemistry 1 and 6; Chemistry 32, 92, and 93 must precede or accompany this course; should be taken in the sophomore year. Lectures, M W, 10. Home Economics Building 245. Practice, M W, 2–5. Home Economics Building 270. Professor ROSE, and Misses BROWNING, KNOWLTON, TITSWORTH, and BLAKEY.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the composition and characteristics of foodstuffs; principles of selecting foods and methods of preparing them; food preservation; comparative nutritive and economic values of various food combinations. Laboratory practice in applying scientific principles to food preparation will be given. Laboratory fee, $7.50 a term.

4. **Household Sanitation.** First term, credit three hours. Must be preceded or accompanied by Dairy Industry 15 and Physics 1; should be taken in the junior year. Lectures, T Th S, 12. Home Economics Building 245. Miss KNOWLTON and others.

The lectures in this course will include consideration of the sanitary conditions of the house and site; the relation of bacteriology to the household in cleaning, in the preservation of foods, in diseases, and in disinfection; personal hygiene, including care of the body in health; heat, light, ventilation, and the disposal of refuse. Every third lecture will be a general lecture of interest to all students. These lectures will give a survey of the field of sanitation, and will be given by specialists in the various topics treated.

5. **Institutional Management.** First and second terms, credit one or more hours a term. Open only to those students who give evidence of ability in this direction. Prerequisite courses 3, 4, 6, and 14; should be taken in the senior year. Lectures, M, 8. Practice, hours by arrangement. Home Economics Building 100. Miss HUNN and others.

This course is intended for students in home economics who wish to gain experience in caring for and feeding large numbers of persons.

6. **Dietetics.** Second term, credit six hours. Prerequisite course 3, Chemistry 32, 92, and 93, and Biochemistry 14 and 18; should be taken in the junior year. Lectures, T Th S, 9. Home Economics Building 100. Practice, T Th S, 10–1. Home Economics Building 270. Professor ROSE and Miss BROWNING

A course for developing a working knowledge of dietetics. A study of methods of investigating dietary problems and of practical means of applying scientific principles in planning dietaries for the family and for institutions; consideration of special problems of nutrition, as in infant-feeding and feeding in cases of abnormal metabolism. Laboratory work will include practice in estimating, planning, and preparing dietaries. An excursion of three or four days to visit schools and various institutions may occur at the close of the spring vacation; estimated expense, $10 to $12. Laboratory fee, $10.50.

7. **Foods and Nutrition, Survey Course.** Second term, credit four hours. Lectures, M W F, 9. Practice, one or two hours, to be arranged. Home Economics Building 245. Miss BROWNING and assistants.

A course intended for students desiring general knowledge of foods, food preparation, and human nutrition. The laboratory work of this course is designed especially to meet the needs of men students who desire a knowledge of nutrition in planning for numbers of employees on the farm or in other occupations. The work is also intended to be a guide to men students in personal selection of food for health and efficiency. Laboratory fee, $3.75.

8. **Elements of Design.** First and second terms, credit two hours a term. Lectures: first term, T, 10; second term, W, 11. Home Economics Building 245. Practice, M or T, 2–5. Home Economics Building 415. Assistant Professor WARNER.

A course dealing with the principles of art expression and their application to the problems of everyday life. In the first term the theory of color and design will be considered and special application will be made to wearing apparel. The object of the work is to give to students a working knowledge of color and to help them to express themselves appropriately in their clothing. In the second term interior decoration and home-furnishing will be considered, and the principles of color and design will be applied to home surroundings. The object of the work is to develop in the students good judgment and taste in the selection and arrangement of home-furnishings, to the end that they may express themselves in their environment. Laboratory fee, $3 a term.

9. **Design, Advanced Course.** Second term, credit two hours. Prerequisite course 8. Practice, hours by arrangement. Home Economics Building 415. Assistant Professor WARNER.

This course is open to students who have talent or a special inclination to continue work in design. The nature of the problems will be determined by the needs of the students and by the possibilities for practical application that may develop. Laboratory fee, $3.

10. **The House.** First and second terms, credit two hours a term. Must be accompanied by course 8. Lectures: first term, Th, 10; second term, F, 11. Home Economics Building 245. Practice, W or Th, 2–5. Home Economics Building 415. Assistant Professor YOUNG.

A course dealing with the house structure, considered from the standpoint of economics and of architecture, accompanied by the analysis of forceful types of plans and exteriors. The object of the course is to develop in the student rational standards of judgment on housing problems by a discussion of the relation of the house plan to home-making, to the individual family, and to the individual site. Special attention will be given to the planning of kitchen and pantry. Laboratory fee, $1 a term.

12. **Woman and the Family.** First and second terms, credit three hours a term. Intended for seniors. First term: lectures, M W F, 10. Second term:

lectures, M W, 10; laboratory, W, 2–4.30. Home Economics Building 100. Professor VAN RENSSELAER and Assistant Professor HAZARD.

In the first term the course embraces a study of woman and the family through early ages to the present time. It treats of survivals with reference to various characteristics and conditions of woman in the family and in the state. Woman's work and her industrial and economic condition are studied with reference to the home and to society. In the second term the course will include a study of crafts as practiced by primitive woman, and of their relation to the present age. The laboratory consists of weaving, dyeing, and work in clay, leather, and metal. A study of materials growing on the university farm will be made in reference to these arts. With this work there is combined a study of the intellectual and spiritual development of primitive woman, and a consideration of her gains and losses by contact with civilization, as well as of her contributions to the arts and crafts of the present civilized peoples. Laboratory fee, $3 for the second term.

14. **Household Management.** First term, credit four hours. Prerequisite course 3 and Political Science 51; should be preceded by course 6; intended for seniors. Lectures, M W F, 11. Laboratory, W, 2–5. Home Economics Building 245. Professor VAN RENSSELAER, and Misses KNOWLTON and BLAKEY.

This course will include a study of the family income, cost of living, household accounts, problems of domestic service, methods of housekeeping, equipment, marketing. The laboratory work will consist of practice in household accounting, cleaning, laundry, management of food, and use of household conveniences. During the term each student will be required to live for one week in the apartment in the Home Economics Building and make a study of the problems of administering a small household. Laboratory fee, $7.

15. **Sewing and Dressmaking.** Second term, credit two hours. Practice, M W, 2–4.30. Home Economics Building 300. Miss TITSWORTH.

This course deals with the fundamental problems of sewing, and includes the practical application of those problems in the making of underwear and wash dresses. Laboratory fee, $1.

16. **Textiles and Dressmaking.** First and second terms, credit three hours a term. Prerequisite courses 8 and 15. Lectures, M, 12. Practice, T Th, 3–5. Home Economics Building 300. Miss TITSWORTH.

A general study of textiles will be made, with special emphasis on those used in clothing. The problems of sewing, as these apply to the teaching of sewing, will be considered. Practical application of the work in design will be made. Laboratory fee, $2 a term.

20. **Special Problems.** First and second terms, credit and hours by arrangement. Prerequisite a fundamental knowledge of home economics; open to seniors and graduate students in home economics, and to other qualified persons by special arrangement. Home Economics Building 100. Members of the departmental staff and others.

A course intended for the development of the individual student in particular lines of work. Special facilities in lectures and practice classes will be arranged for those intending to teach home economics. The course will include a consideration of the logical methods of organizing and developing courses of study. Problems of original investigation will be planned for graduate students, or for undergraduate students who have proved themselves capable of undertaking such work. Laboratory fee to be determined by the amount of work done.

22. **Seminary.** First and second terms, one hour a term. Required of students in home economics and open only to them. Th, 2–4.30. Home Economics Building 100. Professor ROSE.

23. **Extension in Home Economics.** First and second terms, credit two hours a term. Open only to seniors who have given evidence of their ability to develop this work satisfactorily. Lectures: first term, Th, 12; second term, F, 12. Home Economics Building 265. Laboratory, F, 2–5. Home Economics Building 260. Professor VAN RENSSELAER, and Misses NYE, BIRDSEYE, and others.

Principles of extension work in home economics, with special reference to rural communities; organization of material to be presented; manner of presentation—speaking, writing. Laboratory fee, $2 a term.

LANDSCAPE ART

Not open to special students

The instruction noted below may be made to constitute a four- or five-years course in landscape art, leading to the degree of Bachelor of Science at the end of the fourth year and to a special degree, Master in Landscape Design, at the end of the fifth year. The course includes the required work of the College of Agriculture or its acceptable equivalent. The Department aims to teach in four years an appreciation and understanding of landscape improvement. A fifth, or graduate, year better fits the student to enter the more professional field of landscape art, especially when supplemented by one year or more of training in the office of a reputable landscape architect. The individual courses are open to any student in the University who meets the prerequisites or their equivalents.

The Department will give instruction during the third term, beginning with the summer of 1915.

Recommended sequence of studies for professional students in landscape art

The subjects in black-faced type are required of all students in the College of Agriculture.

Freshman year

	Hours 1st term		Hours 2d term
English 1	1	**English 1**	4
Chemistry 1	6	**Chemistry 85**	4
Biology 1	3	**Biology 1**	3
The Farm 1	2	Drawing 2	2–3
Drawing 2	2–3	Landscape Art 2	1

Sophomore year

Geology 1	3	**Physics 2**	5
Botany 1	5	**Human Physiology 3**	3
Architecture 11 (Elements of Architecture)	2	Architecture 11 (Elements of Architecture)	4
Architecture 13 (Shades and Shadows)	1	Architecture 13 (Shades and Shadows)	1
Architecture 9 (Descriptive Geometry)	2	Drawing 3 (Water Color)	2
Landscape Art 3	2	Architecture (History of)	—
Architecture (History of)	—		

Junior year

Political Science 51	3	**Political Science 51**	3
Civil Engineering 10 (Elementary Surveying)	3	Civil Engineering 11a (Topography)	4
Landscape Art 4	2	Drawing 5 (Perspective)	2
Landscape Art 10	1	Landscape Art 4	2
Landscape Art 11	3	Landscape Art 10	1
Landscape Art 13	3	Landscape Art 11	3
		Landscape Art 13	3

Senior year

Drawing 5 (Perspective)	2	Soils 1	3
Landscape Art 15	8	Drawing 4 (Freehand Sketching)	3
Landscape Art 16	2	Landscape Art 15	8
Landscape Art 17	3	Landscape Art 16	2
		Landscape Art 17	3
		Landscape Art 20	1

Suggested additional electives

	Hours 1st term		Hours 2d term
Plant Pathology 1	3	Plant Pathology 2	3
Entomology 3	3	Entomology 3	3
Greek Art and Antiquities 1 (History of Greek Sculpture)	3	Geology 30	3
Philosophy 4 (Fine Arts)	3	Greek Art and Antiquities 1 (History of Greek Sculpture)	3

All instruction in this Department is given in the Landscape Art Building

2. **Lectures Introductory to Work in Landscape Art.** Second term, credit one hour. Lectures, W, 10. Assistant Professor DAVIS.

A general course introductory to an appreciation of the landscape. Prerequisite to course 4, and suggested as of cultural value to the general student. Those intending to specialize in landscape art should elect this course in their freshman year.

3. **History of Landscape Design.** First term, credit two hours. Intended for sophomores in landscape art, but generally elective. Lectures, M W, 11. Assistant Professor DAVIS.

A study of the literature and chronological development of landscape gardening, its modifications in different countries, and the influences that have affected it; a comprehensive study of the history and development of landscape design in relation to landscape work of the present day. Laboratory fee, $1, to cover cost of blue prints used for illustrating the course.

4. **Theory and Æsthetics of Landscape Design.** First and second terms, credit two hours a term. Prerequisite course 2. Lectures, M W, 9. While this course is intended for students specializing in landscape art, it may be elected by any others who satisfy the Department of their ability to do the work. Assistant Professor DAVIS, and visiting lecturers.

A study of the principles of landscape design, and discussions of theory in application to specific problems. The general work of this course is supplemented by special lectures open to the general student and to the public, given by representative farm superintendents, nurserymen, park superintendents, gardeners, garden architects, civic advisers, and landscape architects. Subjects to be covered are ideals, principles, elements, and materials of landscape design—including the theory of roads and allées—as these relate to landscape improvement of public and private properties, including farms, country estates, home grounds, gardens, and parks, and to park maintenance.

6. **Rural Improvement.** A course of six or more lectures, beginning about the Christmas recess. No credit toward graduation. These lectures are outlined primarily for winter-course students. Time to be announced. Professor FLEMING.

This course consists of brief outlines and discussions of the ways and means of bettering out-of-door conditions. It deals with questions of rural improvement in such a manner as to enable the student from the farm to appreciate his landscape problem and opportunities, and to gain a point of view of landscape art. It also offers specific suggestions for the solutions of some of the simpler home problems.

10. **Plan Evolution.** First and second terms, credit one hour a term. Prerequisite courses 3 and 4; interrelated with course 11; intended for juniors. Lectures, F, 9. Mr. MONTILLON.

A detailed study of the plan as controlled by natural or created landscape features—its evolution in design. An explanation of architecture in relation to landscape design.

11. **Landscape Design, Elementary Course.** First and second terms, credit three hours a term. Prerequisite courses 3 and 4; to accompany course 10. Criticism, W, 2–5; two other periods to be arranged. Mr. MONTILLON, assisted in criticisms and judgment by departmental staff.

The solving and drafting of problems supplementary to, and illustrative of, course 10. Explanatory of the theory and principles of landscape design, the aim of the course being to familiarize the student with different types of plans, details, and presentations as applied to different problems.

13. **Elements of Planting Design.** First and second terms, credit three hours a term. Prerequisite Botany 1. Lectures, W, 10. Practice, with criticism, W, 11–1. (An additional period to be arranged.) Assistant Professor CURTIS.

A study of the identification and characteristics of the trees, shrubs, vines, and herbaceous perennials commonly used in landscape planting, together with the elementary principles of their composition. Laboratory fee, $1.

15. **Landscape Design, Advanced Course.** First and second terms, credit eight hours a term. Prerequisite courses 10, 11, and 13, Architecture 9, 11, and 13, and Drawing 2, 3, and 5; intended for seniors. Criticism, T, 9–1; two other periods to be arranged, and additional drafting hours. Mr. MONTILLON, assisted by Professor FLEMING and Assistant Professor DAVIS in consultation, criticism, and judgment.

Work on practical problems in design, finished plans, and reports, together with detailed working drawings and specifications.

16. **Landscape Engineering and Details of Construction.** First and second terms, credit two hours a term. Prerequisite course 10, and Civil Engineering 10 and 11a; intended for seniors. Lectures, T, 9. Practice, T, 10–1. Assistant Professor DAVIS and Mr. MONTILLON.

The engineering work peculiarly necessary to landscape art will be considered in its adaptation to various kinds of surveys, methods of drainage, types of road and path construction, finished grade plans and their staking, together with modeling and mapping in plans, profiles, and sections, estimates of cost, and specifications.

17. **Planting Design.** First and second terms, credit three hours a term. Prerequisite courses 11 and 13; intended for seniors. Lectures, first term, Th, 9. Drafting with criticism, both terms, Th, 10–1. (An additional period to be arranged.) Assistant Professors DAVIS and CURTIS.

A detailed study of the use, adaptation, arrangement, and æsthetic composition of plant materials with reference to the problems of the landscape designer and landscape gardener, together with nursery lists and estimates of cost.

18. **Propagation.** First term, credit one hour. Hours to be arranged. Practice, and occasional lectures. Assistant Professor CURTIS and Mr. HUNN.

A course in the propagation and growth of woody plants, principally such as are used in ornamental and naturalistic planting.

20. **Seminary.** Second term, one hour. Hours to be announced. Departmental staff.

The course includes a review of current literature, the discussion of important questions relating to various phases of landscape work, and reports on investigations.

Excursions. During or at the end of each year, inspection trips will be taken for the purpose of studying good examples of landscape work.

METEOROLOGY

1. **Meteorology and Climatology.** Second term, credit three hours. Lectures, M W F, 10. Roberts Hall 131. Professor WILFORD M. WILSON.

Lectures and weather observations. Designed to acquaint the student with the general circulation of the atmosphere; development, movement, and conditions that attend cyclones, tornadoes, and special storms; practical weather-forecasting from weather maps and local observations; the use of meteorological instruments; general and special climatology and its relation to agriculture.

PLANT BREEDING

1. **Genetics.** First term, credit two hours. Prerequisite Biology 1, and Botany 1 or Zoology 1. Lectures, M, 12. Forestry Building 210. Recitations: Sec. a, W, 11; sec. c, W, 12; sec. e, F, 12; sec. g, S, 8. Forestry Building 210. Sec. b, W, 11; sec. d, W, 12; sec. f, F, 12. Forestry Building, Plant Breeding Laboratory. Other recitation sections may be scheduled if necessary. Professor GILBERT, Mr. BARKER, and assistants.

A general elementary course designed to give students an understanding of the laws of variation and heredity. This is a foundation course for future work in plant breeding, animal breeding, or eugenics. The laws of variation and heredity, the theory of mutation, Mendel's law, and general evolutionary topics will be considered.

2. **Plant Breeding, Laboratory Course.** First term, credit one hour. Must be preceded or accompanied by course 1. Laboratory, M or F, 2–4.30. Forestry Building, Plant Breeding Laboratory. Mr. BARKER and assistants.

A study of plant variation in the field; methods of making hybrids; use of statistical methods in measuring variation, correlation, and heredity; field methods of breeding cultivated plants. A laboratory course designed to accompany course 1, applying the principles of genetics to the breeding of plants. Laboratory fee, $3.

6. **General Plant Breeding.** Third term, credit three hours. Prerequisite Biology 1, and Botany 1 or Zoology 1. Lectures, T Th, 12. Forestry Building 210. Practice, S, 8–10.30. Forestry Building, Plant Breeding Laboratory. Professor GILBERT.

A general elementary course designed to give the principles of plant breeding. The course consists of lectures, recitations, and field practice. Course 6 is similar to courses 1 and 2 combined, except that it is given in the summer, when more and better material is at hand for instructional purposes. Laboratory fee, $3.

8. **Methods of Plant Breeding.** Second term, credit three hours. Prerequisite courses 1 and 2, or 6. Lectures and recitations, M W F, 8. Forestry Building 210. Laboratory work in some of the one-hour periods. Professor GILBERT and assistants.

A study of the practice of plant breeding with special reference to the genetic relations of plants. Methods and results of present-day breeders will be considered.

[10. **Eugenics.** Second term, credit one hour. Prerequisite course 1 or 6, if taken for credit. Professor GILBERT.] Not given in 1914–15.

A study of human heredity. Lectures, discussions, and recitations on the biological aspects of the inheritance of human characteristics and the bearing of such inheritance on the race as a whole.

Advanced and Graduate Courses

11. **Biometry.** First term, one hour. For graduate students only; required of graduate students whose major subject is plant breeding. Lectures and practice, by appointment. Forestry Building. Professor LOVE.

A discussion of statistical methods as applied to problems in biology and practical breeding of plants. The course is designed primarily to develop methods of interpretation and presentation of biological methods.

13. **Plant Breeding, Advanced Course.** First or third term, credit three hours. Prerequisite course 3. Lectures, T Th, 8. Forestry Building 210. Laboratory, one period a week, by appointment. Mr. BARKER.

Conference and field practice on advanced principles and methods of breeding plants. Laboratory fee, $3.

16. **Research.** Throughout the year. Special work for a few advanced graduate students, arranged with reference to individual aims and attainments. By appointment. Forestry Building. Members of the departmental staff.

Problems in plant breeding, heredity, and general evolution. For requirements and directions, see the pamphlet issued by the Department.

17. **Seminary.** First and second terms, one hour a term. For graduate students only; required of all graduate students in plant breeding. Th, 2–4. Forestry Building. Members of the departmental staff.

A seminary for the discussion of the fundamental problems of plant breeding, heredity, and general evolution, methods of plant breeding, and the literature of plant breeding.

PLANT PATHOLOGY

1. **Plant Pathology.** First and third terms, credit three or four hours. Prerequisite Botany 1 or its equivalent. First term: Lectures, W, 12. Bailey Hall. Recitations, F, 12, by sections as follows: graduate, Home Economics Building 100; general agriculture, Agronomy Building 192; pomology, Roberts Hall 292; olericulture, Bailey Hall, Basement; forestry, Forestry Building 126. Practice by limited sections of twenty-five students as follows: graduate, W F, 2–4.30; general agriculture, W F, 2–4.30; pomology, Th, 2–4.30, S, 10.30–1; olericulture, Th, 2–4.30, S, 10.30–1; forestry, T Th, 10–12.30. Bailey Hall, West Basement. (If registration warrants, additional practice sections in pomology and in general agriculture will be offered: recitations, Th, 12; practice, M T, 2–4.30.) Third term: Lectures, W, 12. Bailey Hall. Recitations, F, 12. Bailey Hall, West Basement. Practice, W F, 2–4.30. Bailey Hall, West Basement. (If registration warrants, an additional practice section will be offered: recitations, hour to be arranged; practice, Th, 2–4.30, S, 8–10.30.) Students registering for three hours omit the lectures. Professor WHETZEL, Assistant Professors GREGORY, HESLER, and RANKIN, and Messrs. CHUPP, WEIMER, and KEEFER.

A fundamental course treating of the common diseases of cultivated crops, their nature, cause, and control. A prerequisite for all other courses in plant pathology. Students specializing in those lines indicated by the names of the sections will be expected to schedule this work accordingly. The practice work must be taken in the couplets announced above. Laboratory fee, $4.50; breakage deposit, $2.

2. **Principles of the Control of Plant Diseases.** Second and third terms, credit three hours. Prerequisite course 1. Second term: recitations, F, 12, Bailey Hall; practice, W F, 2–4.30, or Th, 2–4.30, S, 10.30–1, Bailey Hall, West Basement. Third term: recitations, Th, 12, Bailey Hall; practice, Th, 2–4.30, S, 10.30–1, Bailey Hall, West Basement. Assistant Professors GREGORY and HESLER, and Messrs. CHUPP and WEIMER.

A consideration of methods for the control of plant diseases, including sanitation, seed treatment, seed selection, spraying, tree surgery, immunization, preservation of timber, and the like. The practice sections must be taken in the couplets announced above. Laboratory fee, $4.50; breakage deposit, $2.

3. **Advanced Plant Pathology.** First and second terms, credit one or more hours a term. Prerequisite course 1 and permission to register; required of all students taking advanced work. Lectures, M, 12. Bailey Hall, West Basement. Practice by appointment. Professors WHETZEL and REDDICK, and Assistant Professor STEWART.

6. **Mycology.** Second and third terms, credit three hours. Prerequisite course 1 or its equivalent. Lectures, M, 12. Practice, M T, 2–4.30. Bailey Hall, West Basement. Professor WHETZEL, Assistant Professor FITZPATRICK, and Mr. ———.

A synoptical course intended to acquaint the student with the general field of mycology. Laboratory fee, $4.50; breakage deposit, $2.

7. **Principles of the Control of Tree Diseases.** Second term, credit two hours. Prerequisite course 1. Lectures, F, 12. Forestry Building 210. Practice, Th, 10–12.30. Bailey Hall, West Basement. Assistant Professor RANKIN and Mr. KEEFER.

A consideration of the methods for the control of tree diseases, including quarantine measures, disinfection, spraying, tree surgery and wound protection, immunization and protection against ecologic conditions. Designed especially for students in forestry and landscape art. Laboratory fee, $2; breakage deposit, $2.

9. **Timber Decay and its Prevention.** Second term, credit two hours. Prerequisite course 1. Lecture hour by arrangement. Forestry Building 126. Practice, Th, 10–12.30. Bailey Hall, West Basement. Assistant Professor RANKIN and Mr. KEEFER.

A course treating of the cause, nature, and relation to environment of the more common decay processes of wood, and a consideration of the fundamental principles involved in the preservation of timber for commercial uses. Designed especially for students in forestry. Laboratory fee, $2; breakage deposit, $2.

Advanced and Graduate Courses

12. **Mycology.** First and second terms, credit four hours a term. Prerequisite course 1. Lectures, M W, 11. Practice, M T, 2–4.30. Bailey Hall, East Basement. Assistant Professor FITZPATRICK.

Designed especially for students who wish to specialize in plant pathology. The taxonomy and phylogeny of the fungi (Phycomycetes, Ascomycetes, and Fungi Imperfecti). Course 12 alternates with courses 14 and 16. Laboratory fee, $4.50 a term; breakage deposit, $2 a term.

[14. **Mycology.** First term, credit four hours. Prerequisite course 1. Assistant Professor FITZPATRICK.] Not given in 1914–15.

A continuation of course 12 (Basidiomycetes). Courses 14 and 16 alternate with course 12. Laboratory fee, $4.50; breakage deposit, $2.

15. **Phytopathological Histology.** First or third term, credit three hours. Hours to be arranged. Professor WHETZEL.

A study of types of histological modifications of plant tissue resulting from disease. Laboratory fee, $4.50 ; breakage deposit, $2.

[16. **Bacterial Diseases of Plants.** Second term, credit four hours. Prerequisite course 1 and elementary bacteriology. Assistant Professor FITZPATRICK.] Not given in 1914–15.

Designed for students who are specializing in plant pathology. A course dealing with slime mold and bacterial pathogens. Systematic and cultural studies. Laboratory fee, $6; breakage deposit, $2.

20. **Research.** Throughout the year, not less than three hours a term. Professors WHETZEL, REDDICK, and BARRUS, and Assistant Professors FITZPATRICK, STEWART, GREGORY, HESLER, and RANKIN.

Original investigation of problems in plant pathology. Laboratory fee, $1.50 an hour.

25. **Seminary.** Throughout the year. Required of all graduate students in plant pathology. T, 7.30–9 p. m. Bailey Hall, West Basement. Professors WHETZEL, REDDICK, and BARRUS.

The work of the seminary in plant pathology is conducted by the Plant Doctors.

POMOLOGY

1. **Principles in Pomology.** First or third term, credit three hours. Prerequisite Biology 1 or Botany 1. For regular students only. Lectures: First term, T Th, 11; third term, T Th, 10. Roberts Hall 131. Recitations: First term, M or W, 12, F, 11, or S, 9; third term, F, 10. Roberts Hall 292. Professor WILSON, and Messrs. OVERHOLSER and HEINICKE.

A study of fundamental principles in pomology; cuttings, layers, budding, grafting, tillage, cover crops, fertilizing, pruning, spraying, and thinning. These topics are considered in their broadest sense, without application to any particular fruit.

1a. **Pomology, Elementary Course.** Second or third term, credit one hour. Prerequisite course 1, and Biology 1 or Botany 1. For regular students only; required of students taking the advanced courses in pomology. Laboratory course to follow course 1. Second term, W, Th, or F, 2–4.30, or S, 10.30–1; third term, M, 2–4.30. Roberts Hall 202. Professor WILSON, and Messrs. HEINICKE and OVERHOLSER.

Practical exercises in budding, grafting, pruning, and planting; study of varieties, nursery trees, and fruit buds. Laboratory fee, $2.

2. **Practical Pomology.** Second term, credit three hours. Prerequisite course 1. For regular students only. Lectures, T Th, 11. Roberts Hall 131. One recitation, M or W, 12, F, 11, or S, 9. Roberts Hall 292. Professor WILSON and Mr. OVERHOLSER.

A study of the soils, varieties, and planting plans for the orchard; the application of the principles considered in course 1 to practical orchard work; a discussion of the methods of picking, grading, packing, storing, and marketing fruits. This course considers apple, pear, quince, cherry, plum, apricot, and peach.

4. **Small Fruits.** Second or third term, credit one hour. Prerequisite course 1 or 16. Lectures and discussions; second term, M, 11; third term, M, 10. Roberts Hall 292. Professor WILSON.

A course which considers grape, raspberry, blackberry, dewberry, currant, gooseberry, and strawberry. The topics discussed are soils, varieties, propagation, planting, culture, picking, grading, packing, and marketing.

5. **Nuciculture.** First term, credit two hours. Prerequisite courses 1, 1a, and 2. Lectures and discussions, M W, 10. Roberts Hall 392. Professor WILSON and Mr. ———.

Lectures on the practical and systematic phases of nut culture, with special reference to the culture and improvement of the native forms. The Morris collection of edible nuts of the world furnishes abundant material for study. Dr. R. T. Morris offers a prize of $25 for the best work in propagation.

6. **Spraying of Fruit Trees.** Second term, credit one hour. Prerequisite courses 1 and 1a, Plant Pathology 1, and Entomology 3. Practice, T or W, 2–4.30. Greenhouse Laboratory. Professor WILSON and Mr. OVERHOLSER.

Practical exercises in the preparation and application of the spray mixtures used in orchard practice. Laboratory fee, $2.

[7. **Subtropical Pomology.** First term, credit three hours. Prerequisite courses 1, 1a, and 2.] Not given in 1914–15.

A study of citrus and other tropical fruits with reference to American conditions. Laboratory work in describing and judging the various fruits. Laboratory fee, $3.50.

8. **Varieties and Judging.** First term, credit one hour. Prerequisite courses 1, 1a, and 2. Practice, M or T, 2–4.30. Roberts Hall 202. Professor WILSON, and Messrs. ROGERS and HEINICKE.

The course considers a study of varieties and the judging of fruit. From the students in this course teams will be chosen to do practical judging at the annual meetings of the state societies at Rochester. The preparation of the fruit exhibit at the College is required of students in this course. Laboratory fee, $2.

10. **Systematic Pomology.** Second or third term, credit two hours. Prerequisite courses 1, 1a, 2, and 8. Lectures or recitations, F S, 8. Roberts Hall 232. After May 1 in the second term and September 1 in the third term, a laboratory period, S, 8–10.30, is substituted for the Saturday lecture. Professors WILSON and CHANDLER.

A course designed primarily for graduates and students who are preparing to do experimental work. A study of the characters and botanical relationships of the fruits of the United States. Each student is required to collect and mount a number of varieties and species.

16. **Pomology, Elementary and Practical Course.** First term, three hours, without credit toward graduation. Open only to special students. Lectures, T Th, 10. One recitation, S, 10. Agronomy Building 192. Mr. OVERHOLSER.

A study of the methods of propagation and the care of young trees in the nursery; soils, varieties, planting plans, cultivation, cover crops, fertilization, spraying, pruning, and thinning for the orchard; the picking, grading, packing, storing, and marketing of fruits. This course considers the tree fruits that are common to New York State. A trip to orchards near Rochester sometime in October is a part of the work of this course.

17. **Spraying of Fruit Trees.** Second term, two hours, without credit toward graduation. Open only to special students. Lectures, F, 8. Roberts Hall 292. Practice, M, 2–4.30. Greenhouse Laboratory. Mr. OVERHOLSER.

A study of the preparation and application of the spray mixtures used in orchard practice. Laboratory fee, $2.

19. **Research.** Throughout the year, credit one or more hours a term. Prerequisite courses 1, 1a, 2, and 8, and Plant Physiology 20; students taking this course are required to take course 20. F, 10. Roberts Hall 202. Professors WILSON and CHANDLER.

Original investigation of problems in pomology. A typewritten and bound thesis is required.

20. **Seminary.** Second term. One hour. Open only to graduates and to students taking course 10 or 19. F, 10. Roberts Hall 202. Professors WILSON and CHANDLER, Assistant Professor KNAPP, and Messrs. OVERHOLSER, ROGERS, and HEINICKE.

POULTRY HUSBANDRY

1. **Poultry Husbandry.** First or third term, credit three hours. First term: lectures, M W, 11, Poultry Building 375; practice, M, T, or W, 2–4.30, Poultry Building 350. Third term: lectures, T Th, 11, Poultry Building 375; practice W, 2–4.30, Poultry Building 300. Professor RICE, and Messrs. KENT and ———.

An introductory and prerequisite course for students desiring to take specialized courses in poultry husbandry. This course must precede courses 1a, 4, 5, 7, 7a, 8, 11, and 12. The anatomy and physiology of poultry; study of the egg; embryology; nomenclature; bibliography; environmental conditions; the history and scope of poultry husbandry.

1a. **Poultry Husbandry.** First term, credit three hours. Prerequisite course 1. Lectures, T Th, 11. Poultry Building 375. Practice, Th or F, 2–4.30. Poultry Building 350. Professor RICE, and Messrs. KENT and ———.

A specialized course intended for students desiring to make a more extensive study of poultry husbandry than is provided in course 10. To precede or accompany courses 2, 3, 3a, 4, 5, 7, 7a, and 8. Principles of poultry breeding; incubation and brooding; feeding for egg production; fattening and rearing; diseases, parasites, and sanitation.

2. **Feeding and Care.** Second or third term, credit one hour. Must be preceded or accompanied by courses 1 and 1a, or by course 10, and preferably also by Animal Husbandry 1. Time arranged by appointment. Practice, three short periods a day, including Sunday, for four weeks: morning, 7.45–8.30; noon, 12.45–1.15; night, 4.30–5. Poultry Building. Professor RICE and Mr. ANDREWS.

Record-keeping and management of fowls for egg production and for fattening, including preparation for market. Assigned reading and a written examination will be required.

3. **Incubator Practice.** Second or third term, credit one hour. Must be preceded or accompanied by courses 1 and 1a, or by course 10. Time arranged by appointment. Practice, three short periods a day, including Sunday, for four weeks: morning, 7.45–8.30; noon, 12.45–1.15; night, 4.30–5. Poultry Building. Professor RICE and Mr. BUCHAN.

Practice in operating incubators; testing eggs, keeping records, and taking apart and setting up machines. Assigned reading and a written examination will be required.

3a. **Brooder Practice.** Second or third term, credit one hour. Must be preceded or accompanied by courses 1 and 1a, or by course 10. Time arranged by appointment. Practice, three short periods a day, including Sunday, for four weeks: morning, 7.45–8.30; noon, 12.45–1.15; night, 4.30–5. Poultry Building. Professor RICE and Mr. KAZMEIER.

The management of a brooder and a flock of chickens; the keeping of temperature, food, and growth records. Assigned reading and a written examination will be required.

4. **The Breeds and Judging.** First term, credit two hours. Prerequisite course 1. Lectures or recitations, F, 11. Poultry Building 375. Practice, F, 2–4.30, or S, 8–10.30. Poultry Building 175. Messrs. KENT and ———.

The origin, history, and classification of breeds of domestic poultry. Judging the principal breeds for fancy and utilitarian points by score-card and comparison methods, and fitting fowls for exhibition. An excursion to a poultry show will be made.

5. **Poultry House Design and Construction.** Second term, credit two hours. Prerequisite course 1 and permission to register. Lectures or recitations, F, 11. Poultry Building 375. Practice, F, 2–4.30. Poultry Building 350. Professor RICE and Mr. ———.

A study of the principles of poultry-house construction; planning, arranging, and designing poultry houses; laying out foundation plans; cutting rafters; estimating the cost of buildings; studying building plans. An excursion to nearby farms will be arranged.

6. **Poultry for the Household.** First term, credit two hours. Lectures or recitations, S, 8. Poultry Building 375. Practice, S, 9–11.30. Poultry Building 350. Assistant Professor BENJAMIN and Miss ———.

This course is given primarily for students in home economics, but is open to others who have had satisfactory preparation for the work. The course includes a study of changes that take place in poultry flesh and in eggs while they are being held before consumption; the buying of poultry and poultry products; preservation of poultry products; judging dressed poultry; trussing and carving. The use of dried and frozen eggs, as well as the preparation of these and allied products, will also be considered.

7. **Marketing.** Second term, credit two hours. Prerequisite course 1. Lectures or recitations, M, 11. Poultry Building 375. Practice, M, T, or W, 2–4.30. Poultry Building 350. Assistant Professor BENJAMIN and ———.

This course deals with the preparation of poultry and eggs for market, storage, and preservation, and the principles of marketing and advertising. It includes killing, picking, drawing, and packing poultry; testing, candling, grading, packing, and shipping eggs. A class trip to New York City, for two or three days following the Easter vacation, will be required of all students. This trip will give the student an opportunity to become familiar with the live- and the dressed-poultry markets, exchanges, cold-storage plants, egg-breaking establishments, commission and wholesale dealers, city markets, hotel buyers, and housewife organizations. The student will then be in a position to solve his own market problems more intelligently. The trip is essential to the full benefit to be derived from the course. The total necessary cost is about $20.

7a. **Marketing Practice.** First, second, or third term, credit one or two hours. Must be preceded or accompanied by course 7. Time arranged by appointment. Poultry Building. Assistant Professor BENJAMIN and ———.

This course is to accompany or supplement course 7 for those who desire additional instruction in this subject. The work will include the preparation of poultry and poultry products for market; killing, picking, drawing, and packing poultry; testing, candling, grading, packing, and shipping eggs.

8. **Poultry Farm Management.** Second term, credit two hours. Prerequisite courses 1 and 1a; must be preceded or accompanied by courses 2, 3, 3a, 4, 5, and 7; should be preceded or accompanied by Farm Management 1. Lectures or

recitations, W, 11. Poultry Building 375. Practice, Th, 2–4.30. Poultry Building 350. Professor RICE and Assistant Professor BENJAMIN.

This course will include several excursions to representative poultry plants in April and May.

10. **Farm Poultry.** Second or third term, credit three hours. Second term: Lectures, T Th, 9. Poultry Building 375. Professor RICE. Practice, M, T, or Th, 2–4.30, or S, 8–10.30. Poultry Building 300. Messrs. KENT and ———. Third term: Lectures, M W, 11. Practice, M, 2–4.30. Professor RICE, and Messrs. KENT and ———.

A brief course dealing with the practical application of the principles of poultry husbandry. For persons who do not specialize in this subject.

11. **Seminary.** First, second, or third term, or throughout the year, credit one to three hours a term. Prerequisite course 1; must be preceded or accompanied by courses 1a, 2, 3, 3a, 4, 5, 7, and 8; can best be taken in the last year by special students and in the senior year by regular students. Time to be arranged. Poultry Building 350. Professor RICE, Assistant Professor BENJAMIN, and Mr. KENT.

12. **Research.** First, second, or third term, or throughout the year, credit one to three hours a term. Prerequisite course 1; must be preceded or accompanied by courses 1a, 2, 3, 3a, 4, 5, 7, 8, and 11. Hours by appointment. Poultry Building. Professor RICE, Assistant Professor BENJAMIN, and Mr. KENT.

An original investigation of a problem in poultry husbandry, to be presented as a written thesis.

RURAL ECONOMY

1. **Agriculture.** First term, credit two hours. Open only to freshmen. Lectures, T Th, 11. Roberts Hall 392. Professor LAUMAN.

A brief general survey of agriculture in its technical, economic, social, and historical aspects. Designed to give the beginner a view of the whole field of agriculture.

4. **Rural Economy.** First term, credit three hours. Prerequisite Political Science 51. Lectures, M W F, 9. Goldwin Smith B. Professor LAUMAN.

A study of the general economic problems of agriculture.

5. **Rural Social Conditions.** First term, credit three hours. Prerequisite Political Science 51. Lectures, M W F, 11. Agronomy Building 192. Professor LAUMAN.

A study of the social history, status, and problems of the rural community.

6. **History of Agriculture.** Second term, credit three hours. Open only to seniors. Lectures, M W F, 9. Roberts Hall 292. Professor LAUMAN.

The more important phases of the development of agriculture are considered historically.

7. **Marketing and Prices.** Second term, credit three hours. Prerequisite Political Science 51; open only to seniors. Lectures, M W F, 11. Roberts Hall 392. Professor LAUMAN.

A study of markets, the modern methods of marketing, and the course of prices, with special reference to agricultural products.

8. **Cooperation.** Second term, credit two hours. Prerequisite Political Science 51; open only to seniors. Lectures, T Th, 9. Roberts Hall 392. Professor LAUMAN.

A study of the general principles and history of cooperation, with specia reference to agriculture and the conditions prevailing in the United States.

16. **Rural Organization.** Second term, credit one hour. Open only to seniors. Prerequisite course 4 and Farm Management 2. Lectures, M, 10. Roberts Hall 392. Professor BURRITT.

A study of rural cummunity organization as exemplified in farm bureaus, designed to familiarize students with this movement. A county problem will be assigned.

18. **Investigation.** For graduates who are not candidates for degrees, and for advanced seniors by special permission. Credit for undergraduates, two or three hours a term. Bailey Hall, Northwest. Professor LAUMAN.

RURAL EDUCATION

Students in Rural Education should take elementary psychology and educational psychology in their sophomore year, and principles of education in their junior year. They will then be free to elect the necessary work in rural education during the remainder of their course.

1. **Methods.** First term, credit three hours. Open to seniors and juniors who have completed the prerequisites in psychology and education. M W F, 12. Rural Schoolhouse. Professor WORKS.

A study will be made of the organization and presentation of the subject matter of secondary agricultural subjects, text books, use of school plot, and extension activities of the high school.

1b. **Methods.** First term, credit three hours. Open to seniors. M W F, 8. (If more than twenty-five students register, a second section will be arranged, T Th S, 8.) Rural Schoolhouse. Professor WORKS.

A modification of course 1 for students who have not had the prerequisites for that course.

[3. **Types of Schools.** First term, credit two hours. No agricultural prerequisites. Professor WORKS.] Not given in 1914–15.

A consideration of the development of agricultural instruction in this country and abroad. Study devoted mainly to secondary instruction.

[5. **Teaching.** First, second, or third term, credit three hours. Open only to seniors who have completed course 1. Professor WORKS.] Not given in 1914–15.

This course is designed to give students an opportunity to teach under guidance.

9. **Rural School Education Extension.** Second term, credit one hour. Lectures, T, 10. Rural Schoolhouse. Assistant Professors MCCLOSKEY and TUTTLE.

This course is designed for the investigation and discussion of the various methods used by colleges of agriculture for the extension of agricultural education. The work will include the following: the college of agriculture as a center for furnishing accurate subject matter relating to school curricula; correspondence; improvement of grounds and buildings; recommendation of bulletins, books, and equipment; identification of specimens; fairs and exhibitions; school gardens; contests; opportunity for high school teachers to do extension work in elementary schools.

RURAL ENGINEERING

3. **Farm Mechanics.** First, second, or third term, credit three hours. Students are urged to take Drawing 1 in preparation for this course. First and second terms: Lectures, T Th, 10. Dairy Building 222. Practice, M, T, or W, 2–4.30. Rural Engineering Building. Professor H. W. RILEY and assistants. Third term: Lectures, W F, 8. Roberts Hall 292. Practice, F, 2–4.30. Rural Engineering Building. Mr. HAZEN.

A study of the principles of operation, the details of construction, and the practical operation and care of: A—Machinery, including gasoline engines, water wheels, devices for transmitting power, hydraulic rams, pumps, spray nozzles, spraying outfits, water-supply outfits. B—Implements, including plows and binder attachments, with a discussion of the special mechanical features of some of these implements now on the market. Laboratory fee, $2.

4. **Dairy Mechanics.** Second term, credit one hour. Prerequisite course 3. Lectures, M, 11. Dairy Building 222. Professor H. W. RILEY.

A brief lecture course on the principles of construction, installation, operation, and care of steam boilers, steam engines, and steam accessories, and piping for steam.

19. **Research in Farm Mechanics.** First, second, or third term, credit one or more hours. Prerequisite course 3 or its equivalent, and permission to register, together with natural ability in mechanical practice. Professor H. W. RILEY.

Special work in farm mechanics on problems under investigation by the Department or of special interest to the student, provided, in the latter case, that the Department can furnish adequate facilities.

20. **Farm Engineering.** First, second or third term, credit three hours. Prerequisite plane geometry; students are urged to take Drawing 1 in preparation for this course. Lectures: first term, M W, 10; second term, T Th, 8; third term, T Th, 10. Dairy Building 222. Practice: first and second terms, M, T, or W, 2–4.30; third term, W, 2–4.30. Rural Engineering Building. First and second terms, Assistant Professor ROBB and assistants; third term, Mr. STRAHAN.

A study of the practical solution of the elementary problems involved in connection with surveying and mapping the farm; locating, digging, and laying drains; laying out building foundations and farm water-supply and sewage-disposal systems. From the data obtained in the field a contour map will be drawn for one of the fields near the College. Attention will also be given to concrete construction, the design of simple structures, and estimates of their cost. Laboratory fee, $2.

21. **Drainage and Irrigation.** (Same as Soils 21.) Second term, credit three hours. Prerequisite courses 3 and 20 or the equivalent, Soils 1, and Drawing 1 or its equivalent. Lectures, M W, 12. Agronomy Building 192. Practice, Th or F, 2–5. Rural Engineering Building. Assistant Professors ROBB and BUCKMAN, and Mr. STEVE.

A course given in cooperation with the Department of Soil Technology, covering the principles and practice of drainage and irrigation. Two one-day excursions to drainage or irrigation projects at some distance from Ithaca will be held sometime in May. Laboratory fee, $2.

28. **Farm Engineering, Advanced Course.** First, second, or third term, credit two or more hours. Prerequisite course 20 or its equivalent, and permission to register. Lectures, M, 8. Rural Engineering Building. Practice, one problem as assigned. Assistant Professor ROBB.

30. **Farm Structures.** Second or third term, credit three hours. Prerequisite Drawing 1 or its equivalent. Second term: Lectures, T Th, 8. Agronomy Building 192. Practice, Th or F, 2–4.30. Rural Engineering Building. Messrs. HAZEN and STRAHAN. Third term: Lectures, T Th, 12. Roberts Hall 292. Practice, S, 8–10.30. Rural Engineering Building. Mr. HAZEN.

A study of building materials used on the farm; the principles of construction for barns, stables, and other farm buildings, and their application in practice.

SOIL TECHNOLOGY

1. **Principles of Soil Management.** First, second, or third term, credit three hours. Prerequisite Chemistry 1 and Geology 1. Lectures, T Th, 9. Dairy Building 222. One laboratory period a week, daily, 2–4.30. Agronomy Building 42. Students must consult members of the departmental staff before choosing laboratory period. First term, Professor BIZZELL; second and third terms, Assistant Professor BUCKMAN.

A comprehensive course dealing with the origin, composition, and properties of soils, with particular reference to their management in crop production. The laboratories will consist in practice designed to demonstrate fundamental physical relations, and will be supplemented by laboratory lectures. Laboratory deposit, $3.

2. **Soils, Elementary Course.** Second term, two hours, without credit toward graduation. Must be preceded or accompanied by Chemistry 91. Designed for special students. Lectures, M F, 9. Agronomy Building 192. Assistant Professor BUCKMAN.

A practical course in soils, dealing with origin, composition, properties, and modes of handling. The lectures will consist of a practical discussion and demonstration of (a) the formation and classification of soils; (b) tilth; (c) soil moisture and its management; (d) soil amendments; (e) fertilizers and manures; (f) soil biology; and (g) soil management from the standpoint of plant production.

5. **Soil Surveying.** Third term, credit two hours. Prerequisite course 1 and Physical Geography 5. Practice, S, 8–1. Field, and Agronomy Building 42. Assistant Professor BUCKMAN.

A course designed to provide the practical, as well as the technical and theoretical, phases of soil survey. The preparation of base maps and reports will be a feature of the course. Detailed as well as extended soil mapping will be studied. A good field knowledge of glacial geology is necessary for this work.

6. **Soils, Advanced Course.** First term, credit two hours. Prerequisite course 1, and Chemistry 85 and 85a. Lectures, M W, 9. Agronomy Building 42. Professor BIZZELL.

An advanced course designed particularly for students specializing in soil technology. The lectures will deal with the important properties of soils from the theoretical and technical standpoints. The review of literature and preparation of papers will be an important part of the work.

21. **Drainage and Irrigation.** Second term, credit three hours. Prerequisite course 1, Rural Engineering 3 and 20 or the equivalent, and Drawing 1 or its equivalent. Lectures, M W, 12. Agronomy Building 192. Practice, Th or F, 2–5. Rural Engineering Building. Assistant Professors ROBB and BUCKMAN, and Mr. STEVE.

(See Rural Engineering 21.)

11. **Research.** Throughout the year. For graduate students only. By appointment. Agronomy Building 211. Professor BIZZELL.

Three graduate students may register for their major subjects with Professor Lyon.

14. **Seminary.** Throughout the year, no credit toward graduation. Open to seniors having course 6 and required of graduate students. Agronomy Building 42. Professors LYON, FIPPIN, and BIZZELL, and Assistant Professor BUCKMAN.

VEGETABLE GARDENING

For students interested in home gardening only

1. **Home Vegetable Gardening.** Second term, credit two hours. Lectures, T, 9. Home Economics Building 310. Practice, F, 2–4.30. Home Economics Building 370, vegetable greenhouses, and gardens. (If required, an additional section will be scheduled, S, 10.30–1.) Messrs. SCHNECK and KNUDSON.

Vegetables and their production for home use; the planning and management of the garden, growing early plants, special crop requirements, control of pests; study of the factors influencing quality in home-grown as well as in market vegetables. The laboratory work consists chiefly of actual practice in the greenhouse, frame yard, and garden. Each student assumes full charge of his own plantings and cares for them to the end of the term. Laboratory fee, $2.

For students desiring a course for general training and for application in connection with other lines of agriculture

2. **Commercial Vegetable Gardening.** Second term, credit four hours. Prerequisite Botany 1; must be preceded or accompanied by Soils 1. Lectures, T Th, 8. Home Economics Building 310. Recitations, Th or F, 9. (If necessary,

an additional section will be scheduled, S, 9.) Home Economics Building 310. Practice, T, 2–4.30. (If necessary, additional sections will be arranged, W Th, 2–4.30.) Home Economics Building 370, vegetable greenhouses, and gardens. Messrs. WORK and SCHNECK.

The principles of vegetable-growing as applied in commercial production; the scope of the industry and its opportunities; choice of location; equipment; management. The vegetable crops are considered singly, as to their adaptation, culture, special requirements, varieties, enemies, marketing, and profits. The laboratory work includes exercises in growing plants under glass and in the planting and care of early outdoor vegetables. Each student assumes full charge of his own plantings, carrying them through to the end of the term. Laboratory fee, $2.

For students specializing in or desiring a fuller knowledge of vegetable gardening

Students who expect to specialize in vegetable gardening should consult the Department, early in their course, regarding the arrangement of their work. It is recommended that students taking these courses spend the second and third terms of their second year in practical work, thus devoting a full growing season to the gaining of experience in the field. The Department will assist in finding suitable positions for students.

3. **Commercial Vegetable Gardening.** Second and third terms, credit three hours a term. Prerequisite Botany 1 and Soils 1. Lectures, M W, 8. Home Economics Building 310. Practice, M, 2–4.30. Home Economics Building 370, vegetable greenhouses, and gardens. Mr. WORK.

A course covering essentially the same ground as course 2, but considering the problems more thoroughly. The time of this course corresponds with the growing season for the crops, and the student is in touch with plantings of the leading vegetables in the departmental gardens. This affords excellent practice in the care, harvesting, and marketing of the products. Each student is assigned a small garden plot which he cares for throughout the two terms. Several short excursions are made to near-by market gardens. During the summer term there will be a one-, two-, or three-days trip to some of the most important vegetable-growing centers in the State, the cost of which will be $10 to $15; exact date to be arranged. Laboratory fee, $2 a term.

4. **Vegetable Forcing.** First term, credit three hours. Prerequisite course 2 or 3. Should be accompanied by Floriculture 2. Lectures, T Th, 8. Home Economics Building 310. Practice, T, 2–4.30. (If necessary, a second section will be arranged, W, 2–4.30.) Home Economics Building 370, and vegetable greenhouses. Mr. SCHNECK.

Vegetable-growing under glass; important forcing crops. Laboratory work will consist chiefly of practical work in crop production; each student will be assigned a plot in the greenhouse, on which he will grow vegetables to maturity, assuming full charge except as to heating and ventilation. The class will participate in a required excursion to Rochester on December 12, to visit greenhouses; cost, $5. Laboratory fee, $2.

4a. **Vegetable Forcing.** Second term, credit one hour. Prerequisite course 4. Practice, S, 8–10.30. Vegetable greenhouses. Mr. SCHNECK.

The practice work of course 4 will be continued.

5. **Systematic Vegetable Crops.** Third term, credit three hours. Prerequisite course 3, or in special cases course 2, and permission to register. Lectures, Th, 8. Home Economics Building 310. Laboratory, Th F, 2–4.30. Vegetable gardens. Messrs. WORK and DIMON.

Lectures and descriptive studies dealing with vegetable crops, their origin and botany. Special attention will be given to the varieties of the different vegetables, to their characteristics and their adaptation to different cultural and market conditions, and to judging and exhibition work. The important commercial types of different vegetables are grown in the garden each year and there is an abundance of first-hand material for the course. Each student makes special systematic study of a crop or a group of crops, and presents a report in typewritten form. Laboratory fee, $2.

6. **Practice.** First, second, or third term, one or two hours, without credit toward graduation. Prerequisite permission to register. By appointment. Mr. WORK.

Opportunity will be offered for a few students who are specializing in vegetable gardening to obtain practice in greenhouses and gardens.

7. **Vegetable Gardening, Advanced Course.** Problem and seminary. Problem first, second, or third term, seminary second term, credit two or more hours by arrangement. Prerequisite course 3 and permission to register. Seminary, F, 8. Home Economics Building 370. Mr. WORK and assistants.

A special problem, to be arranged; reviews and reports for seminary; occasional short excursions. A typewritten and bound report of the special problem is required. Laboratory fee according to the nature of the problem.

CITIZENSHIP

A course in citizenship open to all students in the University is offered, under the direction of the Department of Political Science. Students in agriculture may elect this course in excess of the twenty hours of non-agricultural electives allowed during the four-years course.

57a. **Lectures on Citizenship.** Second term, credit two hours. M W, 12. Goldwin Smith B.

A lecture each Wednesday by a non-resident lecturer, and one each Monday by a member of the Department. The course has been arranged, in cooperation with the Department, by a committee of Cornell Alumni who are actively engaged in civic and social work. Those who have already agreed to speak are as follows: John Ihlder, Lee F. Hanmer, Munson A. Havens, Henry Bruère, Franklin Matthews, Clinton Rogers Woodruff, Porter R. Lee, Jeremiah Whipple Jenks, John M. Glenn. The course will be under the general charge of Professor Willcox. Readings, written papers, and reports will be required.

EUGENICS

A. **Eugenics.** Second term, one hour. No university credit. Open to all students. Lectures, W, 12. Goldwin Smith A.

A weekly course of public university lectures dealing with the problems of human heredity and their influence on the individual and on the race as a whole. The factors of heredity, environment, and training of human beings in their social and economic relations will be considered. The lectures will be given under the auspices of the Cornell Eugenics Club and will be open to the public.

EXTENSION WORK

The extension work of the College of Agriculture is designed to help persons directly on their farms, and to aid those who desire definite instruction but who cannot take a long or a regular course in agriculture at the University. The work supplements the teaching and experimenting of the College of Agriculture. It is professedly a popular work. It endeavors to reach the common problems of the people, to quicken the agricultural occupations, and to inspire a greater interest in country life. It is also a bureau of publicity, whereby there is an exchange of all important matters connected with the progress of the agriculture of the State.

WINTER COURSES

The Winter Courses now offered are seven in number, all opening on November 10, 1914, and closing on February 12, 1915. They are:

1. Agriculture
2. Dairy Industry
3. Poultry Husbandry
4. Fruit Growing
5. Home Economics
6. Flower Growing
7. Vegetable Gardening

A special program describing these courses will be sent on application to A. R. Mann, Secretary, New York State College of Agriculture, Ithaca, New York.

SUMMER COURSES

The primary object of the Summer School in Agriculture is to further agricultural education by aiding those engaged in it. The courses are arranged to meet the needs of the following classes:

1. Persons who desire to teach agriculture, nature study, and home economics or who desire to fit themselves for the supervision of such instruction.

2. Persons who desire to pursue investigations in agriculture. Some of the courses are advanced, and therefore suited for specialists who wish to follow their individual line of study.

3. College students in Cornell and in other universities who wish to use part of the summer vacation for additional study.

4. Students entering the University who desire to secure surplus credits at entrance and thereby to shorten their course.

In 1914 the Summer School will open on July 6 and close on August 14.

COURSES IN OTHER COLLEGES REQUIRED OF REGULAR STUDENTS IN THE COLLEGE OF AGRICULTURE

1. **English, Introductory Course.** First and second terms, credit four hours a term. Students who have not taken the course in the first term may enter in the second term in sections provided for them. Open only to underclassmen who have satisfied the entrance requirement in English. Freshmen who are candidates for the degree of Bachelor of Arts will ordinarily take course 3, and may not enroll in course 1 except with the consent of the head of the Department. Assistant Professors ADAMS and MONROE; Doctors BAILEY, BROUGHTON, GILBERT, and JENSEN; Messrs. BALDWIN, CROWELL, TOWNLEY, HEBEL, and BOULTER. Twenty-five sections at the following hours: T W Th F, 8, 9, 10, 11, 12. Rooms to be announced.

A study of representative works in English literature, including four plays of Shakespeare, four modern novels, selected essays, and poems of Milton, Tennyson, and Browning. Practice in composition in connection with the reading, with incidental study of the principles of writing. Registration in the course is in charge of Doctor Bailey.

Students who elect English 1 must apply at Goldwin Smith A on Monday, Tuesday, or Wednesday of registration week for assignment to sections.

1. **Introductory Inorganic Chemistry.** Lectures, recitations, and laboratory. Repeated in second term, credit six hours.

1a. Lectures. First term: M W F, 11, Professor DENNIS and Mr. DAVIS; M W F, 12, Professor BROWNE and Mr. DAVIS. Second term: M W F, 11, M W F, 12. Professor BROWNE and Mr. DAVIS. Morse 1.

1b. Recitations (one hour a week to be arranged). Laboratory: First term, M F, 2–4.30; T Th, 2–4.30; W, 2–4.30, and S, 8–10.30. Second term: M F, 2–4.30; T Th, 2–4.30; W, 2–4.30, and S, 8–10.30; M W, 8.30–11. Professors DENNIS and BROWNE, Doctor WELSH, and Messrs. OVERMAN, GULICK, PARMELEE, WEISER, MACK, BENNETT, and HOVEY.

6. **Chemistry, Qualitative and Quantitative Analysis.** Repeated in second term, credit five hours. Prerequisite course 1. Doctor LEMON, and Messrs. LEE, RAY, ELLEY, SMITH, ERSKINE, COOLEY, and GULICK. Lectures, T Th, 12, Laboratory sections: M W F, 2–5; T Th S, 8–11; T Th S, 9–12. Morse 1.

Qualitative work: the properties and reactions of the common elements and acids and their detection in various liquid and solid mixtures.

Quantitative work: the preparation and use of volumetric solutions and work in elementary gravimetric analysis.

1. **Dynamic Geology.** First term, credit three hours. Professor RIES, and Messrs. MONETT, HOOK, and ———. Lectures, T Th, 11; repeated second term, T Th, 9. Sibley Dome. One laboratory period a week, sections M T W Th F. One all-day excursion required.

Planned to give beginners a knowledge of the fundamental principles and facts of dynamic geology by means of lectures, maps, lantern slides, specimens, and textbook and field study. For those who desire to continue in geology this course may be followed in the second term by the elementary course 2, 11, or 21.

2. **Introductory Experimental Physics.** Repeated in second term, credit five hours. Three lectures and two class room periods each week. Lectures: T Th S, 9; M W F, 11. Rockefeller A. Professors NICHOLS, MERRITT, and SHEARER, and Assistant Professor GIBBS. Classroom work: Assistant Professor GIBBS, and Messrs. BUCKLEY, HOWES, MALLORY, RODGERS, SWISHER, THOMPSON, and WEEKS. Hours to be assigned. Required of candidates for B. Chem., C.E., and B.S.

A general survey of the animal phyla, the life processes, adaptations, and relationships of animals, the principles of zoology, and an introduction to morphology and development. As far as possible each phase of the subject will be illustrated with living material.

12. **Veterinary Physiology.** The physiology of the nutrition and secretion of the domesticated animals. Second term, credit three hours. Lectures, T Th F, 10. Veterinary College. Professor FISH.

3. **Elementary Human Physiology.** Repeated in second term, credit three hours. First term, M W F, 10, Professor SIMPSON and assistants. Second term: section A, M W F, 10, Professor SIMPSON and assistants; section B, M W F, 12, Assistant Professor DRESBACH and assistants. In registering for this course in the second term students are required to specify the section that they desire to attend.

An introductory course for students of the biological sciences; also for students who expect to teach physiology in the secondary schools. A general review of the functions of the systems and organs of the human body, with introductory remarks on structure. The lectures will be fully illustrated by experiments, lantern slides, and diagrams, and periodical quizzes and examinations will be given.

51. **Elementary Economics.** First and second terms, credit three hours a term. One lecture and two recitations each week. Lectures: Barnes Auditorium, M, 9; repeated M, 11; Assistant Professor BAUER. Recitations, T Th, 8, 9, 10, 11, 12. Assistant Professors BLAKEY and USHER, Doctor SMITH, and Mr. GILMAN.

An introduction to economics, including a survey of business organization and corporation finance; principles of value, money, banking, and prices; international trade; free trade and protection; wages and labor conditions; the control of railroads and trusts; socialism; principles and problems of taxation. Section assignments are made at the first lecture.

1. **Solid Geometry.** First or second term, credit three hours. T Th S, 11. White 9.

Open to all students, but designed especially for those who have entered with the minor requirements in mathematics and are preparing: (a) to teach mathematics in the secondary schools; (b) to take up engineering work later in the course; (c) to specialize in chemistry, physics, or forestry.

3. **Plane and Spherical Trigonometry.** First or second term, credit three hours. M W F, 11. White 21.

Open to all students, but designed especially for those mentioned under course 1, Solid Geometry. Forestry students will register for only two hours credit and will discontinue the course when the instruction in plane trigonometry is completed.

OFFICIAL PUBLICATIONS OF CORNELL UNIVERSITY

Issued at Ithaca, New York, monthly from July to November inclusive, and semi-monthly from December to June inclusive.

[Entered as second class matter, August 31, 1910, at the post office at Ithaca, New York, under the Act of July 16, 1894.]

These publications include

Catalogue Number (containing lists of officers and students), price 25 cents,

Book of Views, price 25 cents,

Directory of Faculty and Students, Second Term, 1913–14, price 10 cents,

and the following informational publications, any one of which will be sent gratis and post-free on request. The date of the last edition of each publication is given after the title.

General Circular of Information for prospective students, February 1, 1914.

Announcement of the College of Arts and Sciences, May 1, 1914.

Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts, January 1, 1914.

Announcement of the College of Civil Engineering, February 15, 1914.

Announcement of the College of Law, April 15, 1913.

Announcement of the College of Architecture, May 15, 1914.

Announcement of the New York State College of Agriculture, June 1, 1914.

Announcement of the Winter Courses in the College of Agriculture, June 15, 1914.

Announcement of the Summer Term in Agriculture, April 15, 1914.

Announcement of the New York State Veterinary College, April 1, 1914.

Announcement of the Graduate School, January 15, 1914.

Announcement of the Summer Session, March 15, 1914.

Annual Report of the President, November 1, 1913.

Pamphlets on scholarships, fellowships, and prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Correspondence concerning the publications of the University should be addressed to

The Secretary of Cornell University,
Ithaca, New York.